as drivers would try to get on and off I-10. Under the W59 Alternative, drivers would experience fewer delays and shorter average travel times. Additionally, the construction area along I-10 would be shorter with implementation of the W59 Alternative than with the W55 Alternative: 4 miles versus 5 miles (*W59 Alternative Environmental and Engineering Overview* [2010], see sidebar on page 3-2).

Construction Impacts

The W55 Alternative would have required a complex, skewed bridge where the freeway would have spanned both 59th Avenue and the RID canal. Although design concepts were developed that would have accommodated these constraints, construction would have been more expensive than with a traditional bridge overpass and would have caused extensive disruption to local traffic along 59th Avenue. These complex design and construction methods would not be needed with the W59 Alternative.

The W59 Alternative would not reconstruct the 51st Avenue Bridge at I-10. The W59 Alternative would cross the UPRR tracks on a grade-separated structure. 59th Avenue traffic on the frontage roads would cross using two grade-separated structures: one for the northbound frontage road and one for the southbound frontage road. Coordination with UPRR would be required to determine the necessary design considerations and concerns.

Environmental Considerations

Environmental information was reviewed to determine whether the W59 Alternative or W55 Alternative offered any important advantages or constraints over each other. The major differentiators between the alternatives related to displacements and security. Table 3-6 summarizes the anticipated displacement effects of the W59 and W55 Alternatives.

During 2006, ADOT held numerous meetings with business owners, the City of Phoenix, and the Arizona Department of Homeland Security regarding the petroleum storage facilities at 51st Avenue and Van Buren Street. This tank farm provides the majority of fuel for Phoenix Sky Harbor International Airport and is considered by the City of Phoenix and the State of Arizona as a potential terrorist target. As a result of the stakeholder meetings, the W55 Alternative was considered viable if specific security measures were incorporated during construction. The measures included security barriers on the eastern side of the freeway and ramps. The barriers would reduce the potential of vehicles deliberately driving off the freeway and would reduce the tank farm's visibility from the freeway. Additionally, security cameras would be installed to monitor the security barrier and property line. These precautions would not be necessary with the W59 Alternative.

Fourth-tier Screening Results

Fourth-tier screening analyses led to the following conclusions:

- A freeway is still needed, and a lower-capacity facility (Arizona Parkway) would not meet the purpose and need for the proposed project.
- Reducing the number of through lanes by two (to result in an eight-lane freeway) and reducing the R/W needed for the proposed freeway would still meet the purpose and need established for the project at a lower cost and with fewer impacts.
- Although the constrained R/W for the eight-lane freeway would not preclude future expansion of the freeway, it would make any future widening considerably more disruptive to traffic and to nearby residents and businesses and would be much more expensive.
- Because the W59 Alternative would connect to I-10 at an existing service traffic interchange, I-10 (Papago Freeway) traffic would be less affected and have fewer ramp closures, which would be preferable to the greater I-10 operational impacts under the W55 Alternative.
- Although the W59 Alternative would cost approximately 3 percent more than the W55 Alternative, the project team determined the operational benefits to I-10 to be worth the additional expense.

Because of the factors discussed above, the W59 Alternative was carried forward and the W55 Alternative was eliminated from further consideration.

Table 3-6 Comparison of Displacements, W55 and W59 Alternatives

Effect	Action Alternative	
	W55	W59
Business displacements	64	40
Single-family residential displacements	19	45
Multifamily residential displacements[a]	0	680

Sources: Review of aerial photography (2012); field observations in September 2003, January and October 2005, April 2006, March 2008, and February 2010

[a] numbers represent total number of residential units, not number of structures, and all units may not be occupied

Alignment Screening and Further Design Adjustments (Fifth Tier)

Community Alignment

In January 2010, the ADOT Director received a letter from the Community Governor, who indicated that the Community was willing to assist in conducting a study of the proposed South Mountain Freeway on Community land. The Governor requested that the following concerns be addressed in developing a proposed alignment on Community land:

- mitigation of negative impacts of the freeway (noise, trash, etc.)
- avoidance of cultural sites and culturally important properties
- preservation of traditional routes and wildlife corridors between the Sierra Estrella and the South Mountains
- reduction of truck and commuter traffic on 51st Avenue and Beltline Road

In response, the project team conducted preliminary analyses of projected engineering issues, cultural resources impacts, natural resources, multiuse crossings, air quality impacts, noise level impacts, socioeconomic impacts, and Section 4(f) issues. The project team created preliminary designs for major features of the potential freeway alignment (termed the Community

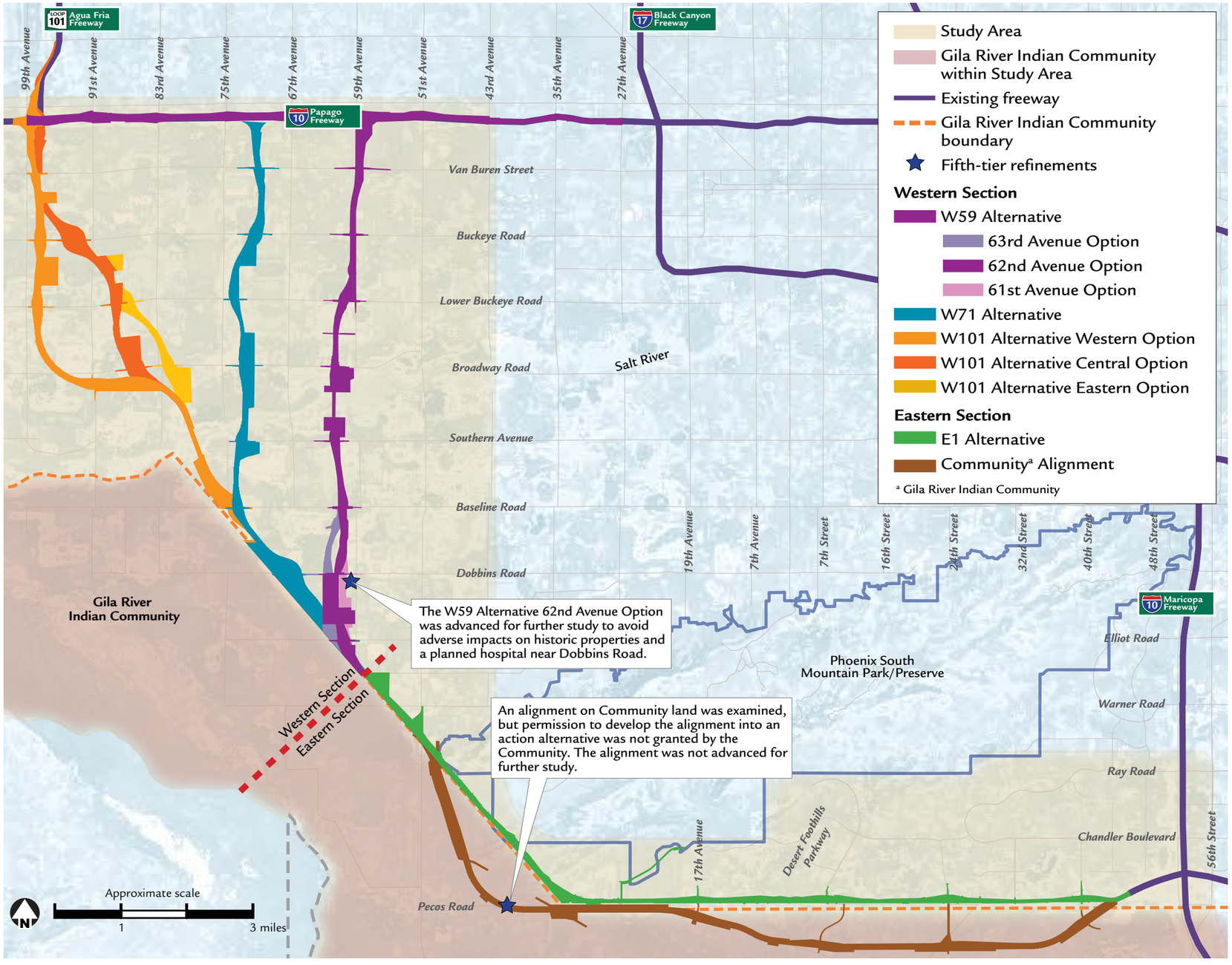
Alignment, Figure 3-11), including proposed freeway cross sections, horizontal and vertical alignments, service traffic interchanges, modifications to local streets and intersections, drainage facilities, bridge structures, major utilities, maintenance needs, landscaping, and aesthetic components. The project team also developed traffic projections for the Community Alignment. The project team compiled a description of current conditions along the Community Alignment and briefly assessed the types of impacts the Community could expect from construction and operation of a freeway along the Community Alignment.

ADOT discussed the results of the preliminary analyses with the Community's Transportation Technical Team in the summer and fall of 2010 and delivered its report on these preliminary analyses in November 2010. Between December 2010 and March 2011, the Community conducted extensive outreach to its members regarding the proposed Community Alignment. After considering the project team's preliminary findings and the comments and concerns of its members, the Community Council approved Resolution GR-164-11 authorizing a referendum of Community members to favor or oppose the construction of the proposed South Mountain Freeway on Community land or to support a no-build option. The Community coordinated referendum occurred in February 2012, and Community members voted in favor of the no-build option. Therefore, the Community Alignment was not carried forward for further study and the E1 Alternative was carried forward as the only action alternative in the Eastern Section.

W59 Alternative Options through Laveen Village

In a letter dated July 18, 2010, the City of Phoenix requested that ADOT and FHWA reexamine the alignment of the W59 Alternative near Dobbins Road in Laveen Village (see Figure 3-11). The alignment presented to the public in 2005 generally followed 63rd Avenue between Dobbins and Elliot roads. This alignment (termed the 63rd Avenue Option) would avoid two historic properties in the area, the Hudson Farm and the Barnes Dairy Barn.

Figure 3-11 Alignment and Design Adjustments, Fifth-tier Screening, Alternatives Development and Screening Process



The Fifth-tier screening process resulted in an alignment shift along the W59 Alternative near Dobbins Road. An alignment was examined on Gila River Indian Community land, but it was not advanced for further study.

The 63rd Avenue Option would adversely affect the planned Laveen Village core and would conflict with City-approved zoning activities in Laveen Village that occurred in the latter part of the past decade.

The 63rd Avenue Option would not be consistent nor compatible with City of Phoenix long-range plans for the Laveen Village core. To support the creation of the Laveen Village core (as planned since the mid-1980s), the City of Phoenix plans to widen Dobbins Road from two lanes to four lanes (with a center turn lane) and has changed the area's zoning to accommodate high-intensity commercial and residential land uses. The Laveen Village core is essentially "downtown" Laveen Village (City of Phoenix 2004a).

In the July 18, 2010, letter, the City of Phoenix supported shifting the alignment east approximately ¼ mile to be more consistent with the Laveen Village core plans. This alignment (termed the 61st Avenue Option), however, would affect a historic property in the area, the Hudson Farm.

A public meeting was held in Laveen in February 2011 to present the 61st Avenue Option and 63rd Avenue Option of the W59 Alternative and to gather input regarding local support for protecting the Hudson Farm.

On June 10, 2011, ADOT submitted a formal request to FHWA to consider an alignment on 61st Avenue (through the Hudson Farm property). FHWA, after serious consideration, concluded the agency could not support the 61st Avenue Option because of its impacts on the historic property.

As a result, examination of other potential avoidance alternatives (besides just the 63rd Avenue Option) was undertaken for the W59 Alternative. At the same time, the project team reevaluated the historic properties in the area. This reevaluation confirmed the importance and eligibility for protection from Section 4(f) of the Hudson Farm and Barnes Dairy Barn, but also determined that the Dobbins Road Streetscape was no longer eligible. This finding allowed for greater flexibility in locating freeway alignments in the area. With this new information, the project team evaluated alignments that would be located east of, west of, and between the 63rd Avenue Option and the 61st Avenue Option.

After extensive discussions with the City of Phoenix and MAG, FHWA and ADOT determined that the 62nd Avenue Option (located between the 63rd Avenue Option and the 61st Avenue Option) would avoid historic properties in the area and would not conflict with City-approved zoning activities in Laveen Village; therefore, the 62nd Avenue Option of the W59 Alternative was advanced for further study and the other options were eliminated from further consideration.

Fifth-tier Screening Results

Fifth-tier screening analyses led to the following conclusions:

- In January 2010, at the Community's request, the project team developed an alignment on Community land. However, the Community rejected this freeway alignment. The Community Alignment, therefore, was not carried forward for further study.
- After discussions with the City of Phoenix and considering input from the public, the project team adjusted the alignment of the W59 Alternative in the Dobbins Road vicinity from 63rd Avenue eastward to 62nd Avenue. This design adjustment avoided historic properties in the area and better conformed to recent local zoning decisions and with the City of Phoenix's *General Plan* with respect to Laveen Village.

Alternatives Development and Screening Process Conclusions

By conducting a multidisciplinary process to screen action alternatives, ADOT, FHWA, and stakeholders participated in an approach in which federal, State, and local agencies (and different departments within those agencies) reviewed and concurred with the alternatives development and screening process. Approaches to each step and findings of each step were reviewed. This led to certain beneficial outcomes in the consideration of the proposed action. Such effects included:

- a comprehensive set of alternatives including all modes was considered at the start of the EIS process
- a comprehensive set of diverse viewpoints and expertise relevant to pertinent determinations associated with environmental concerns, design requirements, traffic operation optimization goals, planning-level cost estimates, and concerns of local importance was represented
- a balanced comparison of the above criteria
- assurance that the screening process was an open process, with results of each step being shared with project team members, local jurisdictions, and the public in a timely manner (see Chapter 6, *Comments and Coordination*, for additional information regarding public disclosure)

The following conclusions were reached through the screening process:

- The purpose and need for the proposed action, as identified in Chapter 1, *Purpose and Need*, was confirmed.
- Nonfreeway alternatives (e.g., TSM/TDM, transit, local arterial street network improvements, Arizona Parkway) alone would not fully satisfy the purpose and need criteria of the proposed action.
- A common point in the Study Area located east of 59th Avenue and south of Elliot Road, as illustrated in the text box on page 3-8, allowed for the evaluation and comparison of action alternatives in two geographic areas: a Western Section and an Eastern Section.
- The South Mountains share a common boundary with—and actually extend onto—Community land for a distance west of the common point. Alternatives located south of the Community or north of the mountains would not be prudent and feasible (see section, *Eastern Section*, on page 3-9 and Table 3-5 on page 3-12). Therefore, any action alternative considered must use either a portion of the mountains, be located on Community land, or both. Because the Community has not allowed the detailed study of alternatives on Community land, there is no prudent and feasible alternative to avoid use of the resources of the South Mountains afforded protection under Section 4(f), including traditional cultural properties and SMPP as a public park and as a historic resource [supported in text presented in Chapter 5, *Section 4(f) Evaluation*]. Therefore, using a portion of the mountains is an unavoidable consequence of the E1 Alternative.

- From EIS process inception for the proposed action, both ADOT and FHWA have worked to engage the Community to develop alternatives on Community land. No alternatives on Community land are studied in detail in the FEIS. To date, the Community has not permitted ADOT to study alternatives in detail on Community land. Despite the efforts to formally study an alternative in detail on Community land, ADOT and FHWA determined that an alternative alignment on Community land is not feasible. The EIS process of evaluating the proposed action in locations other than on Community land will continue.
- A logical, sequential, step-by-step process using data and expertise from multiple disciplines (e.g., environment, design, traffic performance) was used to conclude which of many alignment alternatives represented a full range of reasonable alternatives and which should be eliminated from further consideration.
- The action alternatives carried forward for detailed study in the FEIS represented a range of reasonable alternatives.

Compliance with Section 404(b)(1) Guidelines

Provisions set forth in Section 404(b)(1) of the CWA were the criteria used to evaluate alternatives that would involve discharge of dredged or fill material [see the section, *Waters of the United States*, beginning on page 4-116, for details regarding Section 404(b)(1)]. These guidelines require the U.S. Army Corps of Engineers (USACE) to permit only the least environmentally damaging, practicable alternative. An alternative is considered practicable if it is available or capable of being constructed, taking into account cost, logistics, and existing technology in light of the overall project purpose.

Alternatives described in the previous sections were developed in consideration of the provisions of Section 404(b)(1). Site-specific design criteria for any of the action alternatives would be incorporated to minimize impacts on jurisdictional waters, and compensatory mitigation would be provided for unavoidable impacts. Drainage flows would be maintained in the numerous wash crossings using corrugated metal pipe, concrete box culverts, or bridge structures, depending on engineering feasibility, environmental constraints, field reconnaissance data, and conceptual cost estimates. The section, *Biological Resources*, beginning on page 4-125, outlines measures such as multiuse wildlife crossings that would be implemented in association with natural drainages to mitigate project-related impacts.

Responsiveness of the Proposed Freeway to Purpose and Need Criteria

Previous text in this chapter described the process used to develop and screen various alternatives to 1) determine the types, or modes, of transportation improvements that could meet the established purpose and need criteria for the proposed action and 2) determine the best possible locations for these improvements. One tool used to support the screening process was a modeling analysis that forecast regional traffic conditions as reasonably foreseeable for 2035. Assessment of traffic volumes, traffic conditions, travel distribution, capacity deficiencies, and travel time provided the project team a basis to evaluate all alternatives considered in terms of responsiveness to purpose and need criteria. Determinations to eliminate nonfreeway alternatives from further study were based on analysis findings. The results guided the project team in its assessment of operational characteristics of the future road network, with and without the proposed freeway in place, further confirming the determination that a freeway is the appropriate transportation mode for the Study Area.

Traffic Modeling Background Information

To conduct the analysis, the project team used the tools described in Table 3-7 and, in so doing, applied reasonable assumptions about future traffic characteristics.

Methodology

The traffic assessment for the Study Area employed the MAG travel demand model (TransCAD software platform). FHWA and the U.S. Environmental Protection Agency approved the air quality conformity determination that includes the MAG travel demand model. The model projects demand for multiple modes of travel, including automobile, bus, and light rail. Key model inputs used to forecast travel demand included:

- socioeconomic data based on the adopted general plans of MAG members, along with population and economic forecasts and the existing and planned transportation infrastructure as identified by MAG members
- the anticipated average number of vehicle trips within the region (including those to and from the region's households) on a daily basis (this number is tracked regularly by MAG)
- the distribution of transportation modes used by travelers in the MAG region (also tracked regularly by MAG)
- the capacity of the transportation infrastructure to accommodate regional travel
- the future transportation infrastructure established using RTP-planned projects and improvements and from known arterial street network improvements assumed to be made by the County, Cities, and private developers

Table 3-7 Traffic Analysis Tools Used to Assess a Freeway's Effect on Identified Needs

Analysis Tool[a]	Tool Purpose
Future Traffic Volume Projections (Travel Demand Analysis) (TransCAD[b])	Establish overall demand for and distribution of use of the future network[c] and traffic volume on proposed action
Trip Redistribution (Cut-line Analysis)	Evaluate proposed action's traffic redistribution effect on the network
Level of Service Analysis (TransCAD)	Determine quality of service of network resulting from proposed action and determine capacity needs of proposed action to operate at an acceptable level of service
Existing and Projected Travel Time and Congestion Analysis (TransCAD)	Determine proposed action's effect on network delay and congestion reduction
Trip Distribution (Select Link Analysis)	Establish trip origins and destinations using the proposed freeway

[a] Analytical tools are further described in the section, *Key Traffic Modeling Definitions*, beginning on this page.
[b] TransCAD is the travel demand modeling software platform used by the Maricopa Association of Governments.
[c] future planned transportation network analyzed with and without the proposed action

Key Traffic Modeling Definitions

- **Level of Service Identifies the Operational Efficiency of the Regional Transportation Network** – Existing and projected traffic volumes can

Key assumptions used in analysis of system capacity deficiency

The travel model examined existing conditions and forecast travel demand for 2035 (updated for this project from the 2026 forecasts used for the RTP) with and without the proposed action. Important analytical assumptions were:

- **Nonconstruction enhancements: System enhancements were made in the model to improve the operational characteristics of the existing road network without the proposed action in place. These were enhanced TSM measures.**
- **Mass transit enhancements: Additional capacity beyond what is planned in the RTP was assigned to bus service, light rail, and HOV lanes to reduce dependency on single-occupancy vehicles for travel in the MAG region.**
- **Existing network enhancements: Increased improvements beyond what is planned for the major arterial street network as identified in the RTP were considered in the model.**

Together, the analysis assumptions result in lower regional travel demand for single-occupancy vehicles than would generally be forecast.

Why were these assumptions employed? The resulting "reduced" single-occupancy vehicle demand implies a lesser need for a major transportation facility, such as the proposed action, in the Study Area. In a way, the assumptions confirm that the investment for the proposed action would be warranted. The analysis assumptions —and its results— are, by design, conservative: the results imply that the facility is truly needed.

be determined for the morning commute, evening commute, and throughout the day (see sidebar on page 1-13). From these numbers, transportation analysts are able to determine at which level of efficiency roads and intersections are operating, as measured by LOS. (See text box regarding LOS on page 1-14.)

- **Cut-line Analysis Identifies Distribution of Traffic in the Region** – *Cut line* refers to a tool used by traffic analysts to assess the traffic distribution throughout a road network. It is an imaginary line placed in the road network that crosses a number of road segments. A cut-line analysis allows planners to evaluate changes in the distribution of traffic volumes over time.
- **Select Link Analysis Identifies the Type of Travel Occurring in the Region** – Select link analysis is a tool used to evaluate the volume of traffic using a specific section of road, based on the forecast regional volumes. By identifying where trips through a section of road begin or end, the tool allows analysts to determine the lengths of trips that would occur with or without the proposed action in place. The tool lets analysts determine the percentage of trips that might be local trips (e.g., to and from the grocery store), regional trips (e.g., regional commute), or interstate trips (e.g., "pass-through").

Assessment of 2035 Traffic Conditions

In Chapter 1, *Purpose and Need*, 2035 traffic conditions were examined assuming planned RTP improvements are implemented, but without the construction and operation of a major transportation facility in the Study Area. It was determined that without implementation of such a facility, congestion and resultant delays for motorists would only increase. In this section, operational characteristics of 2035 traffic are also evaluated, this time assuming all planned RTP improvements are implemented, including construction and operation of the proposed freeway.

Forecast Traffic Volumes – Freeways and Arterial Streets

In considering operational characteristics of traffic on the proposed freeway, anticipated ADT volumes on the freeway, if implemented, are critical. Also important is the forecast ADT on other Regional Freeway and Highway System segments and on arterial streets. Because the RTP is an integrated system, future operational characteristics of traffic on any one component will affect and will be affected by traffic on other components. The following text addresses these issues.

Effects of the Proposed Freeway on Other Regional Freeway Segments

Fourteen freeway locations were identified for use in determining the effects of the proposed freeway, as incorporated in the RTP, on freeway traffic volumes in the MAG region (the effects of operation of the proposed freeway on arterial street volumes are discussed later in this chapter). Figure 3-12 presents the forecast ADT volumes with and without the proposed action. Notable observations include:

- The proposed freeway, when in operation in 2035, would function as planned in the RTP. As a link in the Regional Freeway and Highway System, the proposed action would redistribute traffic on the region's freeways; in most cases, the proposed freeway would remove traffic from segments of freeways, while other segments would experience increases in ADT volumes. The proposed freeway would increase the capacity of the region's freeways to respond in part to the projected travel demand; in so doing, some of the traffic volume would be redistributed onto the proposed freeway, as described below.
- I-10 between 48th Street and Broadway Road (the Broadway Curve) would carry approximately 32,000 fewer vpd in 2035. This location currently experiences some of the highest daily traffic volumes and worst congestion in the region.
- SR 202L (Santan Freeway) between Priest Drive and Kyrene Road would carry approximately 42,000 additional vpd in 2035. Similarly, the proposed SR 30 freeway between 83rd and 75th avenues would carry approximately 60,000 additional vpd in 2035. Although these increases could result in additional congestion, without the proposed action, SR 202L (Santan Freeway) and SR 30 would be underused relative to their planned performance in the context of the Regional Freeway and Highway System.

Effects of the Proposed Freeway on Arterial Street Traffic Volumes

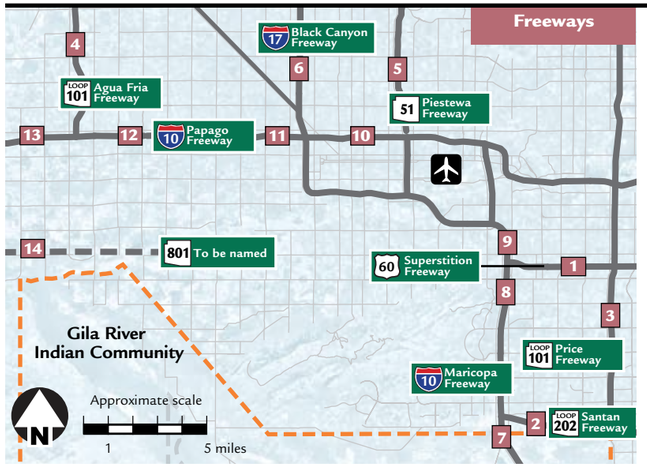
Six cut lines were identified for use in assessing the possible effect of the proposed freeway on traffic volumes, using the arterial street network. Figure 3-12 presents the forecast ADT volumes on the arterial streets and on the freeways through the cut lines (shown in Figure 3-13), with and without the proposed freeway (volumes for the proposed freeway reflect the alignment as proposed in the RTP).

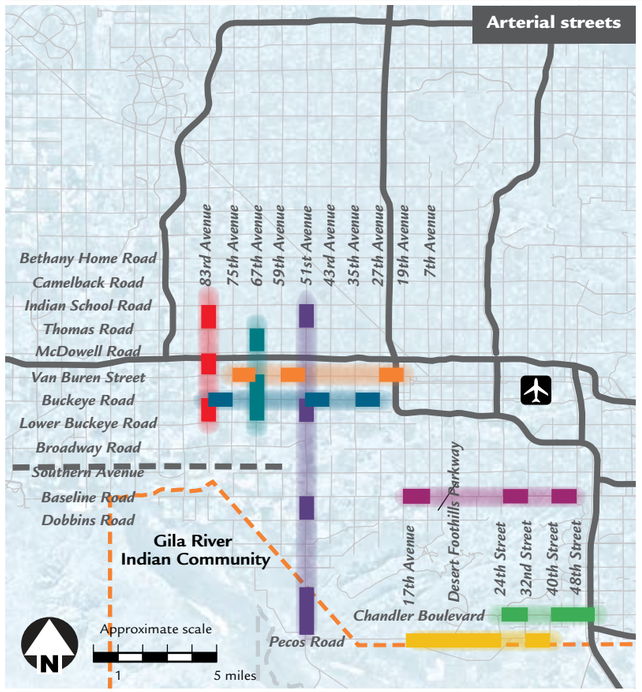
The analysis illustrates a shift in traffic volumes from the arterial street network to freeways if the proposed freeway were in operation in 2035. The traffic reduction on arterial streets is projected to be as high as 68,000 vpd across a single cut line and 274,000 vpd across all six cut lines. As explained in the previous section, this shift in ADT volumes from arterial streets to freeways would not adversely affect the performance of the Regional Freeway and Highway System. Meanwhile, the shift would greatly reduce the pressure on the arterial street network. Such shifts are the intent of the Regional Freeway and Highway System.

Effects of the Proposed Freeway on Capacity Deficiency

Data from the cut-line analysis were used to calculate the capacity deficiency of the road network, assuming the network were to operate at LOS D on average throughout a given day. The analysis considered the capacity deficiency of the road network in the Study Area with and without the proposed freeway in operation in 2035 (see sidebar on this page). Capacity deficiency was calculated by comparing the total capacity and the total demand (projected 2035 volumes) of all of the roads that would cross the 41st Street cut line (see Figure 3-13). According to the assessment, without the proposed freeway in place the existing roads and RTP-planned roadway improvements would accommodate about 69 percent of the demand projected for 2035, leaving 31 percent of the anticipated demand unmet (capacity deficiency—congestion and delays). If better-than-planned scenarios for such modal alternatives as nonfreeway planned improvements (e.g., increases in funding, increases in the number of express bus routes, increases in ridership

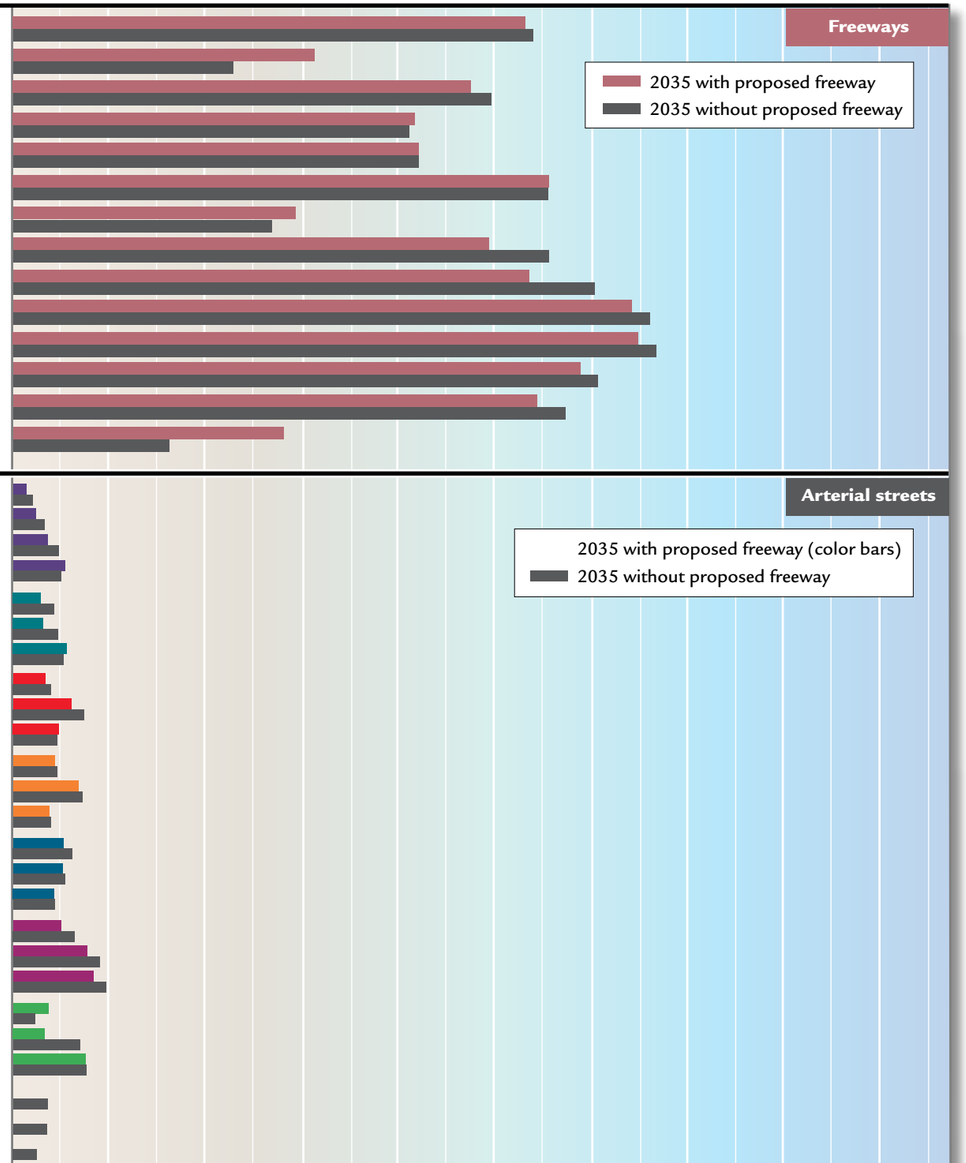
Figure 3-12 Projected Average Daily Traffic Volumes on Freeways and Arterial Streets with and without the Proposed Freeway, 2035





US 60[a]	1. Rural Road to McClintock Drive	−1
SR 202L[b]	2. Priest Drive to Kyrene Road	37
SR 101L[c]	3. Guadalupe Road to Elliot Road	−4
	4. Camelback Road to Bethany Home Road	2
SR 51[d]	5. Indian School Road to Camelback Road	0
I-17[e]	6. Indian School Road to Camelback Road	0
I-10[f]	7. Pecos Road to Wild Horse Pass Boulevard	9
	8. Baseline Road to Elliot Road	−11
	9. 48th Street to Broadway Road	−11
	10. 7th Street to 16th Street	−3
	11. 35th Avenue to 27th Avenue	−3
	12. 83rd Avenue to 75th Avenue	−3
	13. 115th Avenue to 107th Avenue	−5
SR 30[g] (proposed)	14. 83rd Avenue to 75th Avenue	74

51st Avenue	SR 202L to Pecos Road	−32
	Baseline Road to Dobbins Road	−26
	Buckeye Road to Lower Buckeye Road	−24
	Indian School Road to Thomas Road	6
67th Avenue	Buckeye Road to Lower Buckeye Road	−32
	Van Buren Street to Buckeye Road	−33
	Thomas Road to McDowell Road	7
83rd Avenue	Buckeye Road to Lower Buckeye Road	−14
	I-10 to Van Buren Street	−18
	Indian School Road to Thomas Road	4
Van Buren Street	27th Avenue to 19th Avenue	−5
	59th Avenue to 51st Avenue	−6
	75th Avenue to 67th Avenue	−5
Buckeye Road	35th Avenue to 27th Avenue	−15
	51st Avenue to 43rd Avenue	−5
	83rd Avenue to 75th Avenue	−2
Baseline Road	19th Avenue to 7th Avenue	−22
	24th Street to 32nd Street	−15
	40th Street to 48th Street	−14
Chandler Boulevard	27th Avenue to 19th Avenue	58
	24th Street to 32nd Street	−52
	40th Street to 48th Street	−1
Pecos Road	32nd Street to 40th Street	−100
	Desert Foothills Parkway to 24th Street	−100
	17th Avenue to Desert Foothills Parkway	−100



Note: Volumes include general and high-occupancy vehicle lanes; volumes for the proposed freeway reflect the alignment as proposed in the 2003 RTP.[i] The proposed freeway would replace Pecos Road.

[a] U.S. Route 60 [b] State Route 202L (Loop 202) [c] State Route 101L (Loop 101) [d] State Route 51 [e] Interstate 17 [f] Interstate 10 [g] State Route 30
[h] average daily traffic [i] *Regional Transportation Plan*

Source: Maricopa Association of Governments, 2013c; extrapolated analysis

With the proposed freeway in operation, additional planned capacity would be added to the region's freeway system. With the added capacity, freeway volumes would be redistributed, with most freeway segments experiencing reduced average daily traffic volumes. Demand on the arterial street grid would also shift; almost all sampled arterial street segments would experience reduced daily traffic volumes.

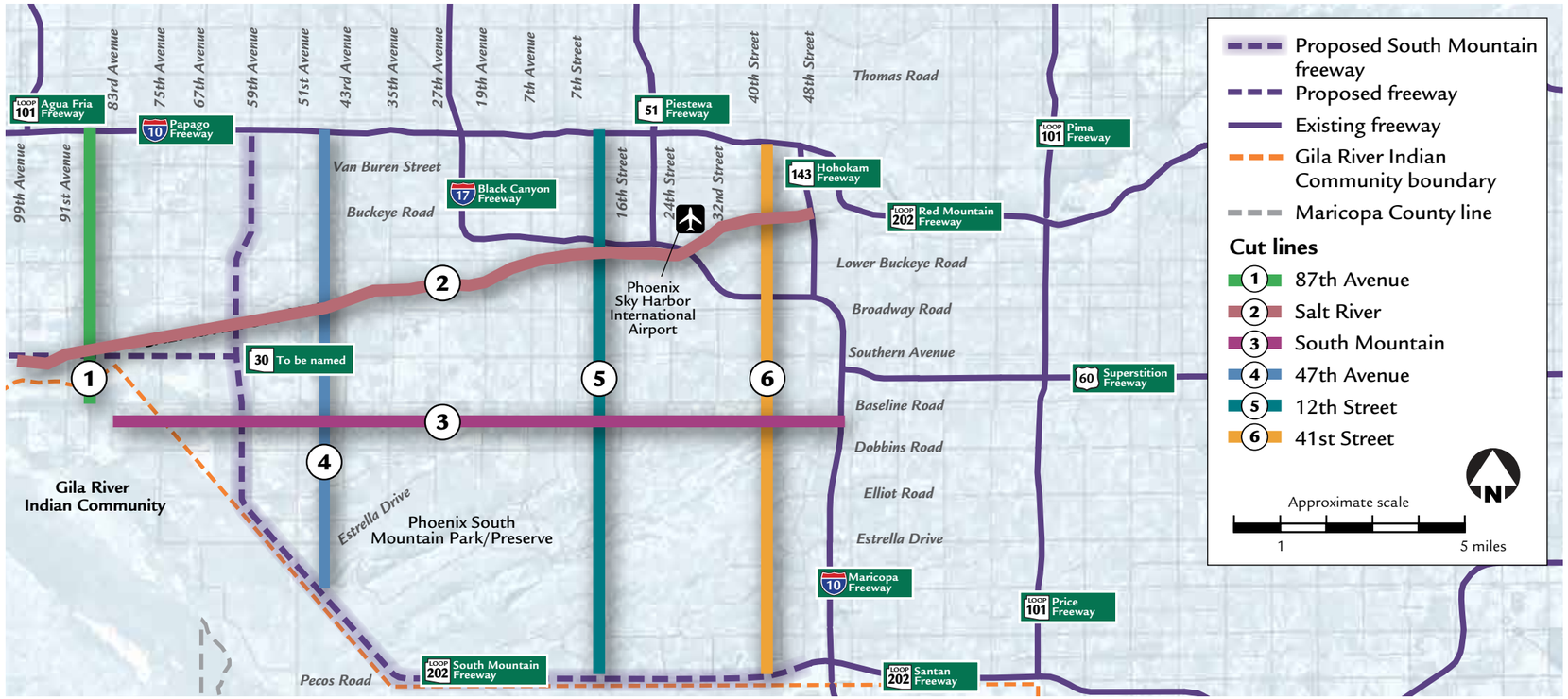
What would traffic be like on the proposed freeway if it were fully constructed and operating in 2035?

Projected volumes would range from 117,000 to 190,000 vehicles per day.[a] Similar volumes were being experienced on other freeway segments in the region (MAG 2010b):

- I-10 (Maricopa Freeway), between Ray and Warner roads, had three general purpose lanes and one HOV lane in each direction and an ADT volume of 151,000 vehicles.
- SR 101L (Agua Fria Freeway), between Camelback and Bethany Home roads, had three general purpose lanes in each direction and an ADT volume of 128,000 vehicles.

[a] rounded from projections presented later in this chapter for the W59 Alternative

Figure 3-13 Cut-line Analysis with and without the Proposed Freeway, 2035



Cut line		Alternative	Volume (000s)			Split (%)	
			Total	Freeways	Arterials	Freeway	Arterial
1	87th Avenue: I-10[a] (Papago Freeway) to Baseline Road	With proposed freeway	511	436	75	85	15
		Without proposed freeway	482	387	95	80	20
2	Salt River: 99th Avenue to SR 143[b] (Hohokam Expressway)	With proposed freeway	1,031	769	262	75	25
		Without proposed freeway	906	576	330	64	36
3	South Mountain: 83rd Avenue to I-10 (Maricopa Freeway)	With proposed freeway	478	385	93	81	19
		Without proposed freeway	398	279	119	70	30
4	47th Avenue: I-10 (Papago Freeway) to Estrella Drive	With proposed freeway	502	327	175	65	35
		Without proposed freeway	542	325	217	60	40
5	12th Street: I-10 (Papago Freeway) to Pecos Road	With proposed freeway	907	711	196	78	22
		Without proposed freeway	868	618	250	71	29
6	41st Street: SR 202L[c] (Red Mountain Freeway) to Pecos Road	With proposed freeway	963	707	256	73	27
		Without proposed freeway	931	611	320	66	34
	All six cut lines	With proposed freeway	4,392	3,335	1,057	76	24
		Without proposed freeway	4,127	2,796	1,331	68	32

[a] Interstate 10 [b] State Route 143 [c] State Route 202L (Loop 202)

Source: Maricopa Association of Governments, 2013c; extrapolated analysis

The total volume removed from the arterial street network for all six cut lines with the proposed freeway in place in the Study Area in 2035 would be 274,000 vehicles per day. Based on the arterial lane capacity from the Maricopa Association of Governments travel demand model, this equates to 33 arterial street-lanes of traffic being removed from the six cut-line locations. The cut-line analyses validate a purpose of the proposed action: to redistribute traffic appropriately based on travel needs.

for transit modes) were to occur, 13 percentage points of the 31 percent deficiency would be accommodated (Figure 3-14); the network would still maintain an 18 percent capacity deficiency.

The same analysis with the proposed freeway in operation in 2035 concluded that the met demand would increase to 80 percent; better-than-planned scenarios noted above, if achieved, would reduce network deficiency to 7 percent. The proposed action would capture over half of the capacity deficiency not captured by these other modes.

Forecast Traffic Volumes on the Proposed Freeway

In 2035, forecast ADT on the proposed freeway would vary depending on location. Projected ADT would range from 117,000 to 190,000 vehicles. These projected volumes are similar to volumes being experienced on other freeways in the MAG region (see sidebar on the next page). The projected volumes demonstrate:

- Motorists would place a high demand on the proposed freeway in this area of the MAG region.
- The proposed freeway, when in operation in 2035, would function as an integral part of the RTP.

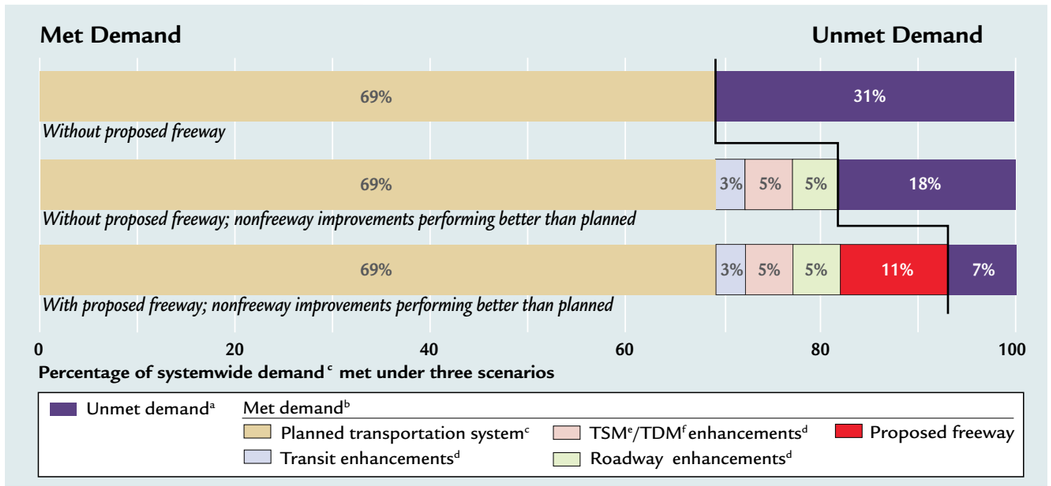
Level of Service

The previous sections described how the proposed freeway, by adding capacity to the freeway system in the MAG region, would reduce traffic on some freeway segments and reduce traffic on the arterial street network. This section presents the results of the analysis to assess how these changes in traffic volumes would translate to system efficiency in terms of LOS.

Future travel and socioeconomic conditions were modeled in TransCAD (see Table 3-7, on page 3-27) to determine the duration of LOS E or F in 2035 with and without the proposed freeway during the morning and evening commute periods. Results of the analysis are illustrated in Figures 3-15 and 3-16. Notable observations from the analysis are:

- For an urban area, such as the Phoenix metropolitan area, it is expected that freeways would operate at LOS E or F during some portion of the peak commuting periods. Demand to use the proposed freeway would be high (an intended outcome).
- When the heavy congestion duration would last longer than 1 to 2 hours, the utility of the freeway would be reduced and regional mobility hampered.
- The number of freeway segments operating at LOS E or F would be higher during the evening commuting period than in the morning commuting period.
- During the morning commute, the freeways inbound to downtown Phoenix including eastbound I-10 (Papago Freeway), westbound I-10 (Maricopa Freeway) along the Broadway Curve, and westbound SR 202L (Red Mountain Freeway) would experience shorter durations of LOS E or F with the proposed freeway than without. Additionally, the inner loop freeways, I-10 and I-17, that encircle downtown Phoenix would experience shorter durations of LOS E or F with the proposed freeway than without.
- During the evening commute, portions of planned SR 30 and SR 202L (Santan Freeway) would experience a longer duration of LOS E or F with the proposed freeway than without the proposed freeway. This demonstrates that the freeways would be in high demand and would work as intended as a part of the loop freeway system.
- During the evening commute, almost all of the region's freeways would experience long periods of LOS E or F, including the proposed freeway. Because most of the freeways providing service outbound from downtown Phoenix would experience over 3 hours of LOS E or F, it is difficult to identify substantial differences between the evening conditions with and without the proposed freeway. However, when comparing other measures of effectiveness, such as capacity deficiency and travel time, conditions with the freeway would still be better than conditions without the freeway during the evening commute.

Figure 3-14 Met and Unmet Demand with and without the Proposed Freeway, 2035



Source: Maricopa Association of Governments, 2013c; extrapolated analysis

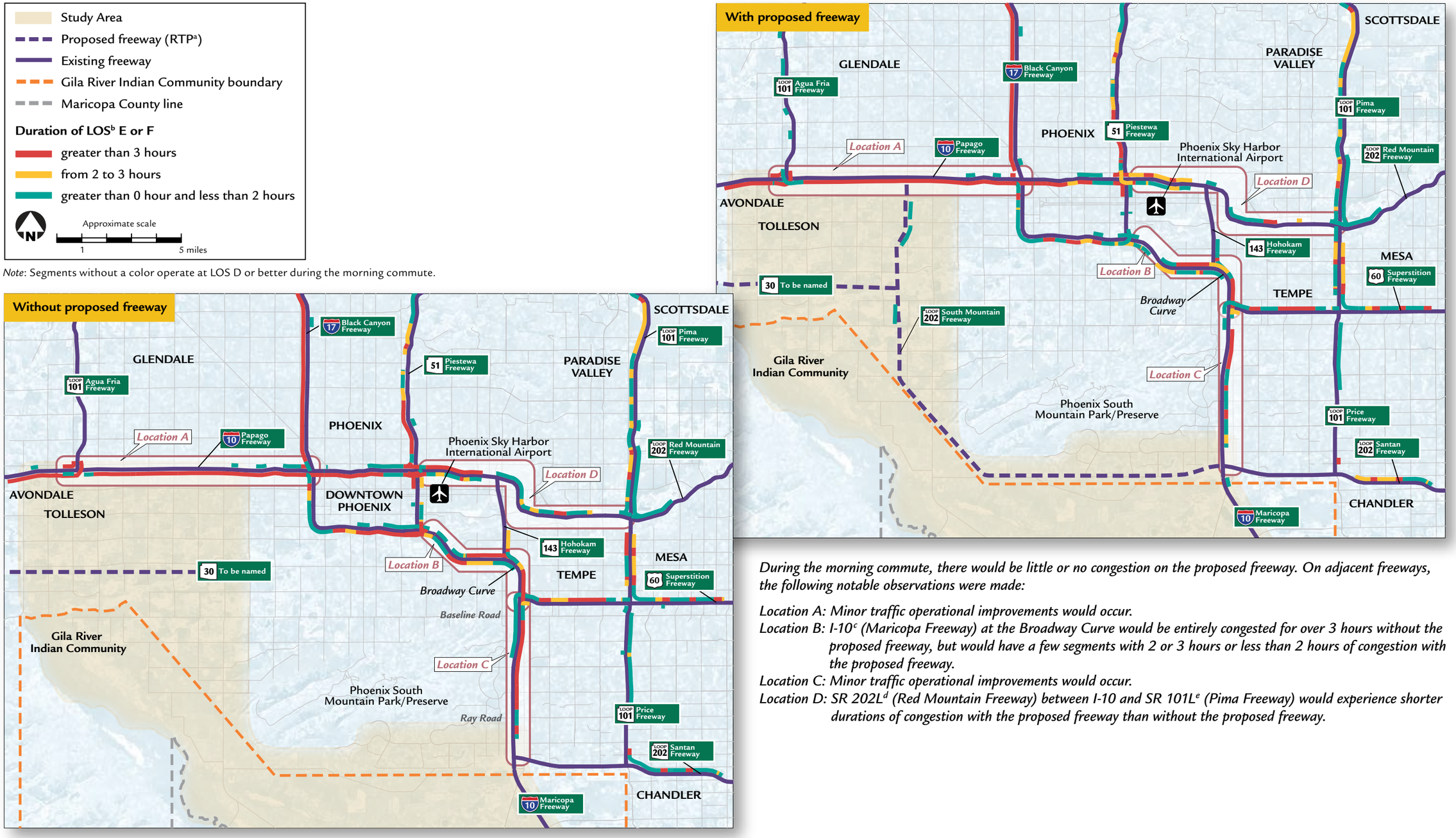
[a] Unmet demand means delays and congestion for travelers on the Maricopa Association of Governments (MAG) transportation network.
[b] Data are extrapolated from the 41st Street cut-line analysis (see text and Figure 3-13) to characterize performance for the entire MAG transportation system.
[c] The analysis assumes that the MAG *Regional Transportation Plan* is fully implemented.
[d] improvements that could occur in the better-than-planned scenario (see sidebar on page 3-28)
[e] transportation system management
[f] transportation demand management

Implementation of the freeway would not completely solve the regional systemwide capacity deficiency in 2035. The proposed freeway's additional operating capacity would alleviate about 61 percent (see red bar) of the projected 18 percent regional system capacity shortfall when incorporating the most optimistic scenario for adoption and performance of nonfreeway improvements.

Projected Travel Time

Within the Study Area, existing traffic congestion has decreased travel speeds during much of any given day on the region's freeways or on its arterial street network. The amount of time a motorist spends driving each day to and from the same origin and destination continues to increase. Travel time is important to most drivers; further, increases in travel time translate to further congestion and congestion-related impacts (as certainly would be the case under the No-Action Alternative). It is important, therefore, to examine representative travel times in different locations and project to 2035 what travel times would be with and without the proposed action.

Figure 3-15 Duration of Level of Service E or F with and without the Proposed Freeway, Morning Commute on Freeways, 2035



Note: Segments without a color operate at LOS D or better during the morning commute.

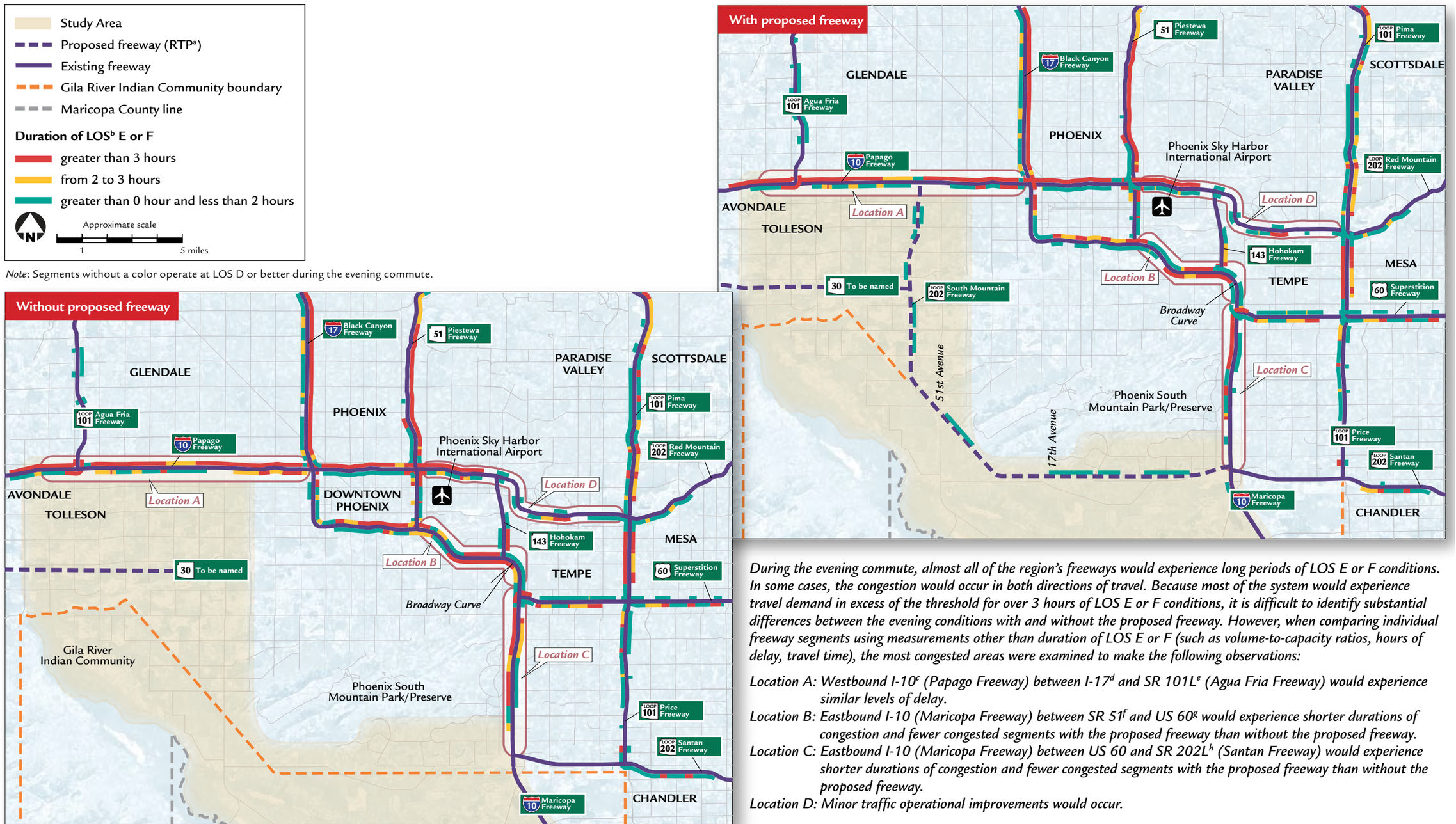
During the morning commute, there would be little or no congestion on the proposed freeway. On adjacent freeways, the following notable observations were made:

Location A: Minor traffic operational improvements would occur.
Location B: I-10[c] (Maricopa Freeway) at the Broadway Curve would be entirely congested for over 3 hours without the proposed freeway, but would have a few segments with 2 or 3 hours or less than 2 hours of congestion with the proposed freeway.
Location C: Minor traffic operational improvements would occur.
Location D: SR 202L[d] (Red Mountain Freeway) between I-10 and SR 101L[e] (Pima Freeway) would experience shorter durations of congestion with the proposed freeway than without the proposed freeway.

[a] *Regional Transportation Plan* [b] level of service [c] Interstate 10 [d] State Route 202L (Loop 202) [e] State Route 101L (Loop 101)

Source: Maricopa Association of Governments, 2013c; extrapolated analysis

Figure 3-16 Duration Level of Service E or F with and without the Proposed Freeway, Evening Commute on Freeways, 2035



Note: Segments without a color operate at LOS D or better during the evening commute.

During the evening commute, almost all of the region's freeways would experience long periods of LOS E or F conditions. In some cases, the congestion would occur in both directions of travel. Because most of the system would experience travel demand in excess of the threshold for over 3 hours of LOS E or F conditions, it is difficult to identify substantial differences between the evening conditions with and without the proposed freeway. However, when comparing individual freeway segments using measurements other than duration of LOS E or F (such as volume-to-capacity ratios, hours of delay, travel time), the most congested areas were examined to make the following observations:

Location A: Westbound I-10[c] (Papago Freeway) between I-17[d] and SR 101L[e] (Agua Fria Freeway) would experience similar levels of delay.

Location B: Eastbound I-10 (Maricopa Freeway) between SR 51[f] and US 60[g] would experience shorter durations of congestion and fewer congested segments with the proposed freeway than without the proposed freeway.

Location C: Eastbound I-10 (Maricopa Freeway) between US 60 and SR 202L[h] (Santan Freeway) would experience shorter durations of congestion and fewer congested segments with the proposed freeway than without the proposed freeway.

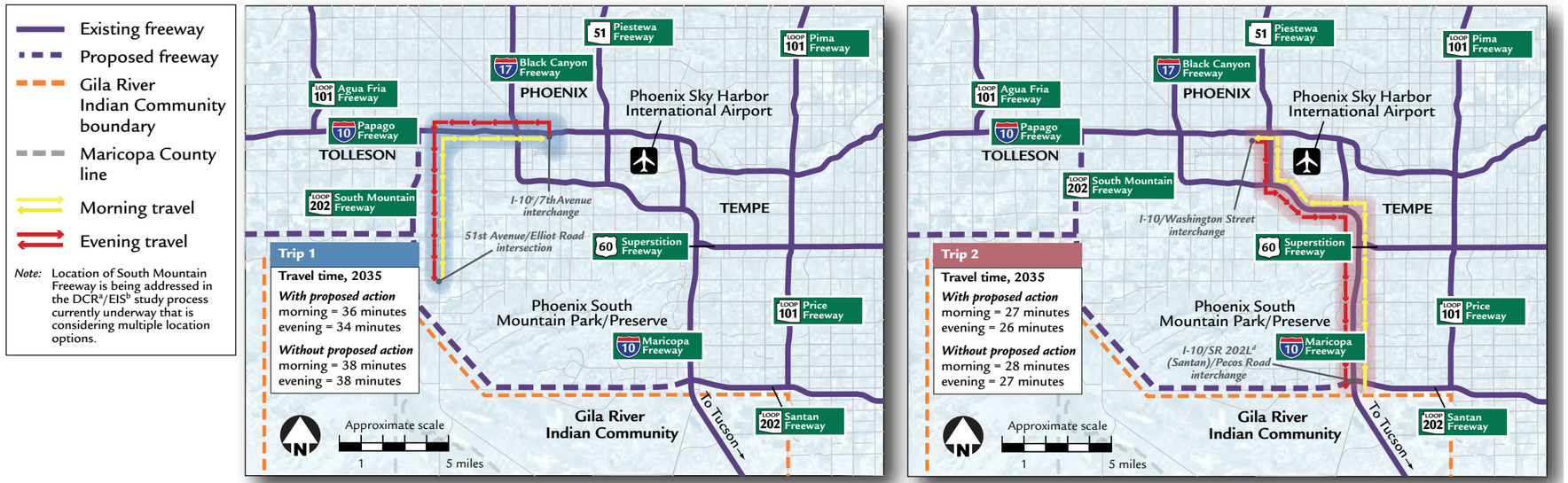
Location D: Minor traffic operational improvements would occur.

[a] *Regional Transportation Plan* [b] level of service [c] Interstate 10 [d] Interstate 17 [e] State Route 101L (Loop 101) [f] State Route 51 [g] U.S. Route 60 [h] State Route 202L (Loop 202)

Source: Maricopa Association of Governments, 2013c; extrapolated analysis

3

Figure 3-17 Representative Travel Times with and without the Proposed Freeway, 2035



[a] design concept report [b] environmental impact statement [c] Interstate 10 [d] State Route 202L (Loop 202)

Source: Maricopa Association of Governments, 2013c; extrapolated analysis

Time savings would be experienced during peak travel times of the day. Taken individually, savings may not appear to be substantial, but when considered in the context of the hundreds of thousands of drivers, each day, over the course of numerous years, the cumulative time savings would be substantial.

Table 3-8 Regional Travel Times, 2035

Freeway Segment			Travel Time[a] (minutes)		
Begin	**End**	**Direction**	**Without Proposed Freeway**	**With Proposed Freeway**	**Difference**
Avondale	**Downtown Mesa**	Westbound Eastbound	65 66	63 64	–2 –2
Avondale	**Downtown Scottsdale**	Westbound Eastbound	67 67	65 65	–2 –2
Avondale	**Arizona State University (Tempe Campus)**	Westbound Eastbound	60 61	58 59	–2 –2
I-10[b] (Maricopa Freeway)/SR 202L[c] (Santan Freeway) System Traffic Interchange	**I-10 (Papago Freeway)/SR 101L[d] (Agua Fria Freeway) System Traffic Interchange**	Westbound (via I-10)	57	53	–4
		Eastbound (via I-10)	57	54	–3
		Westbound (via I-10 or SR 202L)	57	32	–25
		Eastbound (via I-10 or SR 202L)	57	33	–24
Ahwatukee Foothills Village	**Phoenix Sky Harbor International Airport**	Northbound Southbound	18 23	18 23	0 0
Ahwatukee Foothills Village	**Downtown Scottsdale**	Northbound Southbound	35 37	31 31	–4 –6
Ahwatukee Foothills Village	**Downtown Phoenix**	Northbound Southbound	28 27	27 26	–1 –1

[a] Travel times reflect the most congested conditions of the peak periods. [b] Interstate 10 [c] State Route 202L (Loop 202)
[d] State Route 101L (Loop 101)

Source: Maricopa Association of Governments, 2013c; extrapolated analysis

Travel times were calculated using the TransCAD model results based on the road type and projected LOS. The two trips presented in Figure 1-13, on page 1-20, were incorporated into the 2035 forecast conditions. The results for the two trips for conditions with and without the proposed freeway are presented in Figure 3-17.

Additional trips were identified to represent a regional perspective. As depicted in Table 3-8, motorists undertaking regional trips would also experience shorter travel times with the proposed action.

Travel time savings indicated in Figure 3-17 and Table 3-8 are based on an individual vehicle for a specific trip. When travel time savings are considered cumulatively for all vehicles traveling in the region with the proposed freeway in operation, the reader can begin to see the aggregate time savings realized. Further, a monetary savings can be assigned to the time savings: the region would realize a savings of approximately $200 million annually once the freeway were to become

operational (see the section, *Economic Impacts*, beginning on page 4-56, regarding travel savings).

Major Points Regarding 2035 Traffic Conditions

Based on the assessment of projected 2035 traffic volumes, LOS, capacity deficiency, and travel time, the following conclusions are reached:

- Nonfreeway alternatives, separately or in combination, would capture only a small percentage of the capacity deficiency of the region's transportation network.
- The proposed freeway would serve as a planned link in the Regional Freeway and Highway System, causing traffic on the region's freeways to be redistributed. In most cases, the proposed freeway would remove traffic from some segments of freeways, while other segments would experience RTP-intended increases in daily volumes. The proposed freeway would increase the capacity of the region's freeways in response, in part, to projected regional travel demand.
- The proposed freeway would appropriately shift a substantial portion of travel demand from the arterial street network to the freeway network in 2035. Within the Study Area, travel demand would remain relatively the same with or without the proposed freeway, demonstrating that the proposed freeway would absorb the majority of volume projected in the Study Area.
- The proposed freeway would increase projected 2035 network capacity by capturing over one-half of the projected 2035 deficiency (see Figure 3-14).
- Travel times during the morning and evening commuting periods at representative locations of the regional transportation network would be shorter with the proposed freeway in operation in 2035 than without the proposed freeway.
- Motorists would place a high demand for the proposed freeway in the Study Area.

The freeway alternative is the appropriate solution to the regional transportation need identified in the Study Area. The freeway alternative would serve as a planned link in the loop system in the Regional Freeway and Highway System, optimize overall Regional Freeway and Highway System performance, and redistribute traffic as intended between the arterial street and freeway networks.

Additional Benefits of the Proposed Freeway

Identification of the freeway mode as the preferred mode for the proposed action would result in additional benefits related to the purposes for a major transportation facility in the Study Area and would also provide system linkage, improve regional mobility, and be consistent with local and regional planning. (See Chapter 1, *Purpose and Need*, regarding FHWA guidance for determining a proposed project's purpose and need.)

System Linkage

The Regional Freeway and Highway System, a major component of the RTP, addresses the region's transportation needs. The Regional Freeway and Highway System was designed to function as part of an integrated surface transportation network comprising an arterial street network, a system of loop freeways, and major freeways connecting to cities outside the region. System continuity is critical in optimizing:

- the effectiveness of individual network segments
- the use of transit
- freeway management strategies

The RTP-planned improvements for the Regional Freeway and Highway System assumed that a freeway would be located in the Study Area in the foreseeable future. If a freeway were not built to provide this capacity, future traffic distributions and volumes would vary from those used to plan and design other major facilities. Because of these discrepancies, recent improvements could be oversized (e.g., too many lanes), undersized (e.g., too few lanes), and/or could operate in a manner that would not satisfy the intended uses.

As an example, the freeway was planned as a portion of SR 202L, in part to accommodate longer trips in the MAG region and to reduce demand on other parts of the regional freeway, Interstate, and arterial street networks. Without the connecting link created by the proposed freeway, SR 202L (Santan Freeway) would be underused in 2035. Because I-10 (Maricopa Freeway) would not have the capacity to accept the full traffic volume the Santan Freeway could deliver to it, motorists who might have used the Santan Freeway may choose other available but already congested routes.

The proposed freeway would also serve as an important link to planned transportation facilities in the region. Two transportation projects in initial planning stages and adjacent to the Western Section Preferred Alternative would be affected if the No-Action Alternative were to be the Selected Alternative: SR 30 and Avenida Rio Salado (ARS)/Broadway Road. Both projects have been planned to address important east–west travel demand and to provide motorists with alternatives to using the heavily congested I-10 (Papago Freeway).

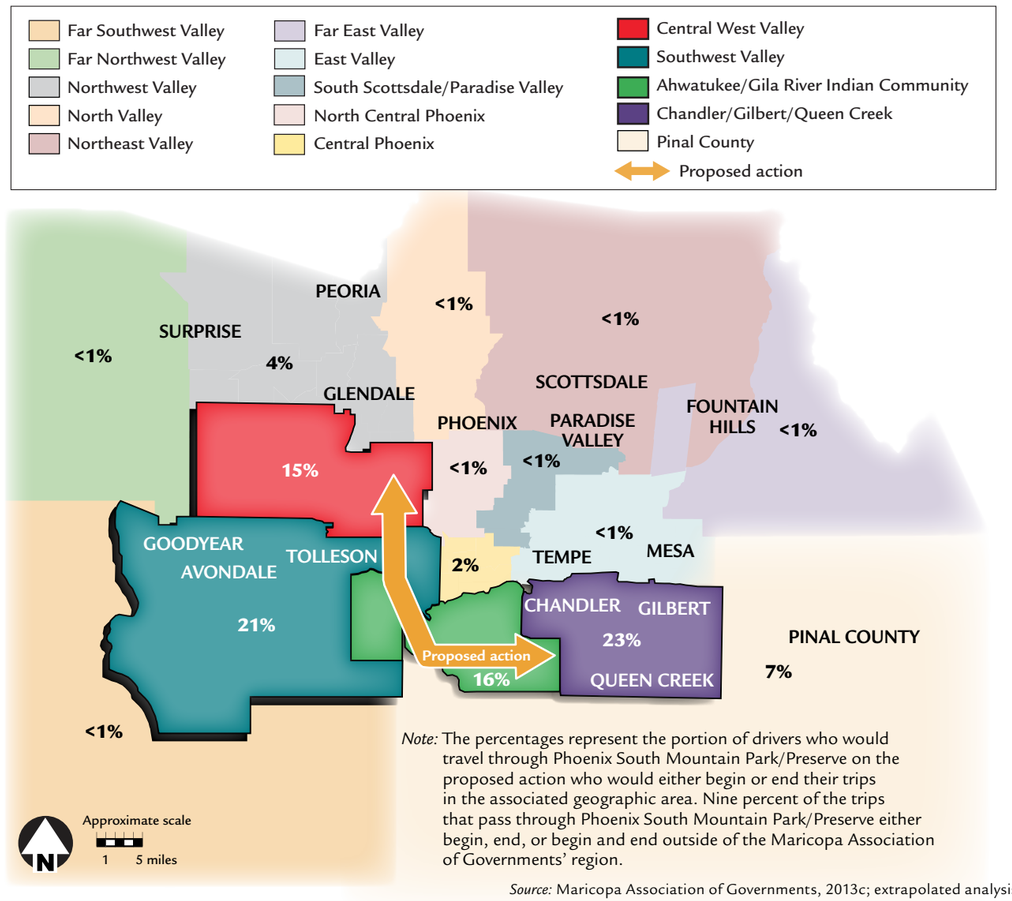
The proposed SR 30, part of the Regional Freeway and Highway System and RTP, would construct a new freeway between SR 303L and the proposed action (connecting south of Broadway Road), in the interim, with future plans to ultimately extend SR 30 farther west to SR 85. The proposed ARS project, being planned by the City of Phoenix as a part of the RTP Arterial Streets Program, would involve developing new east–west arterial street capacity south of the Salt River to provide better access to and from downtown Phoenix and to connect to the Regional Freeway and Highway System. The proposed ARS project would widen, improve, and extend Broadway Road from 7th Street to, in the interim, 51st Avenue, with future plans to ultimately connect to the proposed action and to SR 30. More information about SR 30 is available at <azdot.gov/projects/phoenix-metro-area> and about the ARS project is available at <avenidariosalado.com/about.php>.

If the No-Action Alternative were the Selected Alternative, both SR 30 and ARS would need to be reassessed in terms of purpose and need, logical termini, and traffic performance. If a system traffic interchange were not provided at the eastern terminus of SR 30 with the proposed freeway, eastbound freeway-volume traffic would enter a local road network designed for—at most—arterial-street traffic loads: an unworkable configuration. The length and alignment of SR 30 would likely have to be altered. Therefore, the proposed freeway mode plays an important role in relation to operation of the region's existing and planned freeway systems.

Regional Mobility

As presented in Chapter 1, *Purpose and Need*, the Study Area for the proposed action is located such that it would serve an area that would experience almost 50 percent of the projected increases in population, housing, and employment between 2010 and 2035 for the entire MAG region.

Figure 3-18 Select Link Analysis, Origins and Destinations within and outside the Region, 2035



Note: The percentages represent the portion of drivers who would travel through Phoenix South Mountain Park/Preserve on the proposed action who would either begin or end their trips in the associated geographic area. Nine percent of the trips that pass through Phoenix South Mountain Park/Preserve either begin, end, or begin and end outside of the Maricopa Association of Governments' region.

Source: Maricopa Association of Governments, 2013c; extrapolated analysis

By estimating where travelers in a given location are coming from and where they are going, the project team was able to project 1) the types of trips future users of the proposed freeway might undertake and 2) the distribution of these trips. Seventy-five percent of travelers anticipated to use the proposed action would be involved in trips beginning or ending in the Study Area itself or in the areas immediately surrounding it.

As an important component of the loop route function of the Regional Freeway and Highway System, the proposed freeway would help to address east–west regional mobility needs. Figure 3-18 illustrates the results of a select link analysis. In this analysis, the origins and destinations of all vehicles forecast to be on the proposed action through SMPP were plotted. A projected 75 percent of travelers anticipated to use the proposed action would be involved in trips beginning or ending in the Study Area itself or in the areas immediately surrounding it. The proposed action would be used heavily by traffic from the eastern and western areas of the MAG region. This conclusion is supported by findings recounted in the section, *Need Based on Socioeconomic Factors*, beginning on page 1-11.

Legislation – Regional and Local Planning

Regional Planning Context

When county voters passed Proposition 300 in 1985, public and local planning agencies expected the Regional Freeway and Highway System would be implemented as planned. STB approval of the South Mountain Freeway alignment in 1988 reinforced that expectation. What essentially is now the proposed freeway has been included in MAG transportation planning documents since 1985 and is included in the RTP. Therefore, a freeway in the Study Area is consistent with voter mandate, regional planning objectives, and public expectations.

Local Planning Context

The proposed action is directly or indirectly referenced in municipalities' long-range planning efforts.

Avondale

The proposed action is not mentioned specifically in the adopted *Avondale General Plan 2030* (2012). The circulation (transportation) element of the plan, however, identifies "promote Avondale in regional transportation issues" as a goal. In addition, one of the policies in the plan's land use element is to "coordinate with Goodyear, Phoenix, Litchfield Park, Tolleson, and Maricopa County regarding land use and transportation along Avondale's borders." The proposed action is not inconsistent with the *Avondale General Plan 2030.*

Chandler

Only a small portion of Chandler is located in the Study Area. This portion is designated for employment uses. The City of Chandler *General Plan* (2008) does not specifically discuss the proposed action, but does show the South Mountain Freeway as a proposed freeway on the Regional Context Map.

Phoenix

The proposed action is included in the City of Phoenix *General Plan*, Circulation Element (City of Phoenix 2001). As stated in the voter-approved and formally adopted 2002 update, "the Circulation Element discusses how to reduce the rate of increased traffic congestion, which is increasing faster than population growth."

Goal 1 of the Circulation Element states:

> An effective multi-modal transportation system should be developed that will allow the movement of goods and all people safely and efficiently throughout the city, especially into, and between, the urban village cores.

Several policies are outlined to implement this goal, one of which is Policy 7:

> Encourage timely construction of the freeways and expressways in the adopted Maricopa Association of Governments Plan. One of the freeways identified in the plan is the South Mountain Parkway.

Another policy of the Circulation Element is to "plan and design the city's transportation system to help implement the Land Use Element's goals while assuring that new transportation facilities are available concurrently with changes in land use." The proposed action is an integral component in two area land use plans for Phoenix neighborhoods traversed by the 1988 alignment. The two plans are the *Southwest Growth Study/Laveen: A Guide for Development* (City of Phoenix 1998) and the *Estrella Village Plan* (City of Phoenix 1999). In both plans, urban village planning areas show village cores developed around a "South Mountain Freeway." Based on these plans, development, zoning, and residential and commercial location determinations in the past several

years have been made assuming a "South Mountain Freeway" generally near the 1988 alignment.

Tolleson

The *2005 Tolleson General Plan* established a goal to maintain and enhance streets to retain Tolleson's community character. A strategy to attain this goal was to "maintain assertive leadership to prevent freeways and major highways (such as Highways 101 and 202 Extensions) from bisecting Tolleson." The plan states that "a 99th Avenue corridor alignment would pose extreme hardship on the City of Tolleson due to vast amounts of right-of-way that would be needed." A 99th Avenue Growth Area is denoted in the plan, in which a preference for commercial land uses is stated. In addition, the plan states that both Phoenix and Tolleson support and prefer an alignment for the proposed freeway near "55th Avenue" (most similar to the W59 Alternative).

Conclusions Regarding Appropriateness of the Proposed Freeway as the Modal Alternative

In the 1980s, a phased transportation network (the Regional Freeway and Highway System) was proposed and adopted to serve the region's transportation demands (see the section, *Historical Context of the Proposed Action*, beginning on page 1-5) resulting from growth in employment, housing, and population. The South Mountain Freeway was determined to be a key link in the Regional Freeway and Highway System. At the onset of the EIS process, the transportation network was reexamined to determine whether a major transportation facility was still needed and, if so, what mode would be an appropriate method of meeting the identified need. The need to serve the transportation demands of a growing region was still applicable. It was further determined that the freeway mode was an appropriate response to this need.

The proposed freeway was also determined necessary to serve future transportation demand from continuing job, housing, and population growth in the area that would be served by the proposed freeway. The proposed freeway was refined to provide system linkage and regional mobility and to address regional and local transportation planning efforts. Based on these efforts, it was determined the proposed freeway was needed even more now than in the past and that the proposed freeway would address the identified need. Some of the results of the analyses described in the previous sections are presented in Table 3-9, along with a summary of the proposed freeway's ability to meet the purpose and need criteria.

The proposed freeway clearly meets the purpose and need criteria of the project. When considering the historical context of the proposed freeway, its context in regional transportation planning, and analyses of existing and projected regional transportation demand and capacity, the proposed freeway is a needed element of the integrated transportation infrastructure network in the MAG region because:

- The rationale for identifying the Study Area as the location for a major new transportation facility is supported by:
  - The proposed action has a historical identification as an important part of the planned integrated regional transportation infrastructure and loop freeway systems to support citizens of the MAG region.
  - Almost 50 percent of the projected increases in population, housing, and employment between 2010 and 2035 for Maricopa County is expected to occur in the southwestern and southeastern portions of the Phoenix metropolitan area.
- The analytical results presented in Chapter 1, *Purpose and Need*, and in this chapter identify a need for a major transportation facility and present reasons that the proposed freeway is the facility to meet that need:
  - The quality of current operating conditions during peak operating periods on the regional transportation facilities in the Study Area and its surroundings is poor, with much of the network congested.
  - Travel within the MAG region is projected to increase by approximately 50 percent between 2012 and 2035.
  - Performance of the majority of region's freeways and arterial streets is projected to be poor—at LOS E or worse without the proposed action in operation in 2035.
  - Operation of the proposed freeway would appropriately redistribute projected traffic onto the remaining Regional Freeway and Highway System, Interstate freeways, and arterial street network when compared with the projected traffic volumes without the proposed freeway in operation.
  - Without the proposed freeway, the RTP's planned facility improvements would accommodate about 69 percent of the total 2035 projected demand (operating at LOS D), leaving 31 percent of the anticipated demand unmet.
  - Better-than-planned performance of nonfreeway modal transportation improvements, including transit, TDM/TSM, and other expanded arterial street network improvements, alone or cumulatively, would not be sufficient to adequately address the projected 2035 capacity deficiency.
  - Travel time during peak periods would increase between 2012 and 2035, with or without the proposed freeway; such travel times would, however, not increase as much with the proposed freeway in operation.
- The proposed freeway is a major component in the Regional Freeway and Highway System, which is intended to function as an integrated freeway network. The system linkage provided by the proposed freeway would further optimize system continuity and the effectiveness of individual network segments, which are important to overall Regional Freeway and Highway System operation.
- The proposed freeway is an important component of past, current, and known future planning efforts. Maricopa County, Phoenix's villages (Laveen, Estrella, and Ahwatukee Foothills), Tolleson, and Avondale have all made transportation, land use, and economic planning determinations in a context of the proposed freeway operating in the Study Area.
- The proposed freeway would function as planned and intended in the RTP.

Table 3-9 Implementation of the Proposed Freeway as the Appropriate Modal Alternative to Satisfy Purpose and Need Criteria, 2035

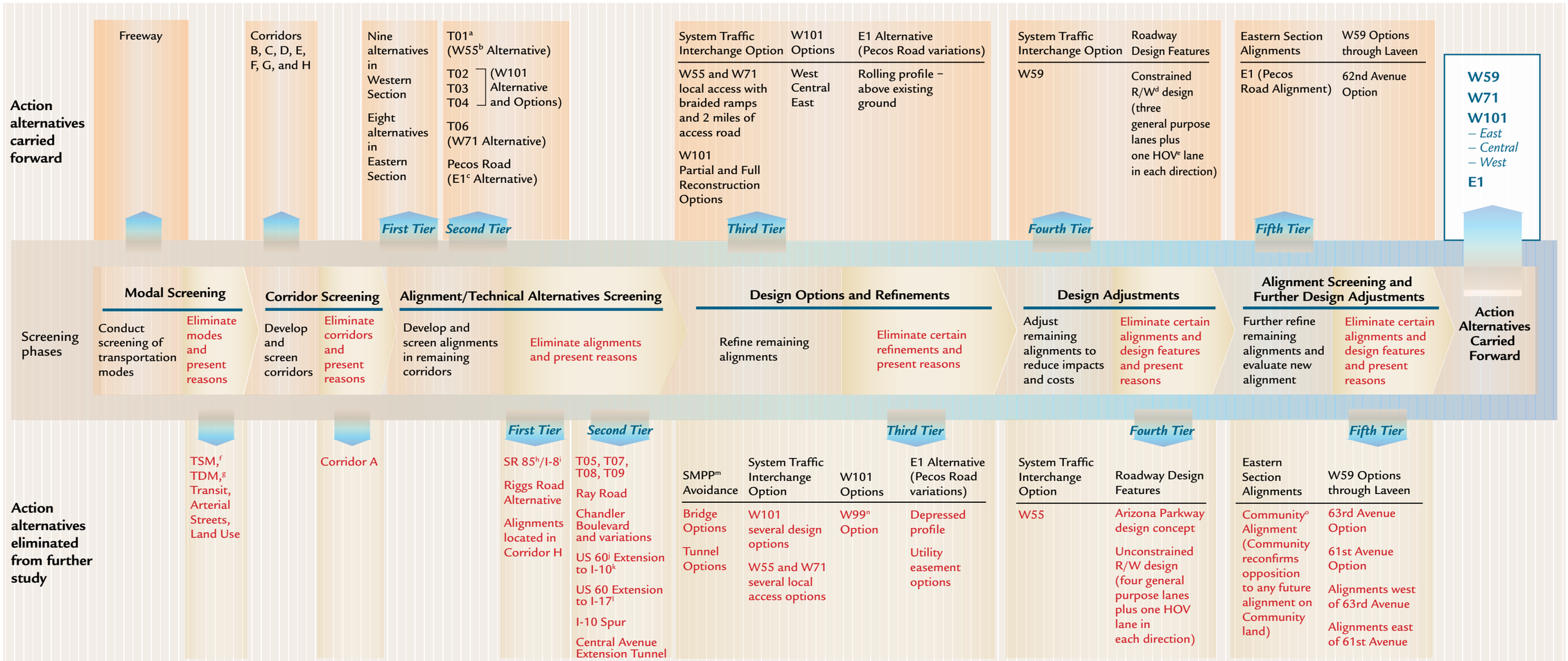
Criterion	With the Proposed Freeway	Without the Proposed Freeway
Who would use the proposed freeway?	• 75 percent of drivers using the proposed freeway would be coming from or traveling to the area surrounding the proposed freeway; this area is projected to experience almost 50 percent of the growth in Maricopa County by 2035	• Travelers would continue to use existing routes such as I-10[a] and Baseline Road, which would become more and more congested • Increased congestion and travel time would occur because no other high-capacity facilities (e.g., freeways) are planned in the area
How would the proposed freeway affect the average traveler?	• By reducing congestion, travel times would improve within the region, resulting in an estimated $200 million annual savings in travel time	• Trip times and traffic congestion would worsen without the proposed freeway
What effects would the proposed freeway have on the regional freeway system?	• Would improve the regional transportation network as planned for during the past 25 years, increasing the efficiency of other existing and planned freeways • Would remove traffic from congested freeways and arterial streets • Would optimize use of adjacent freeways such as SR 202L[b] (Santan Freeway) and the proposed SR 30[c]	• Freeways would not experience congestion relief provided by proposed freeway • If the connections were not provided, the need for other planned freeways would have to be reassessed and reanalyzed in terms of traffic performance • Segments of the regional freeway system, such as SR 202L (Santan Freeway) and SR 30, would be underused
What effects would the proposed freeway have on the area's arterial street network?	• Proposed freeway would reduce traffic on arterial streets by 274,000 vpd[d], which equates to 33 arterial street-lanes of traffic being removed from the system	• Street widening and intersection improvements would be needed to address increased congestion, but these improvements are not planned or funded and obtaining the right-of-way for these improvements would be difficult
What effects would the proposed freeway have on areawide continuity and connectivity?	• Would complete the freeway loop system (as part of SR 202L) • Would increase mobility and access by connecting freeways such as SR 202L (Santan Freeway) in the east to SR 30, SR 101L[e], and SR 303L[f] in the west	• Freeway loop system would be incomplete; SR 202L would be incomplete and underused • An alternative connection between the eastern and western portions of the Phoenix metropolitan area would not be provided • Motorists on the local arterial street network would have to drive longer distances on these congested streets before being able to gain access to Interstate and regional freeways
What effects would the proposed freeway have on the area's overall transportation capacity deficiency?	• 20 percent of the travel demand in 2035 would remain unmet (see Figure 3-14, on page 3-31); 11 percent less than without the proposed freeway, which would make a substantial difference for the areas's overall transportation network	• 31 percent of the travel demand in 2035 would remain unmet (see Figure 3-14, on page 3-31)
Would the proposed freeway affect traffic in the Broadway Curve[g] area of I-10?	• Proposed freeway would reduce daily traffic volumes by 32,000 vpd on this portion of I-10 and to the south on I-10 between Baseline and Elliot roads, more than any other segments of the region's freeways • During the morning commute, the Broadway Curve would experience shorter duration of LOS[h] E or F conditions	• Would carry approximately 11 percent more traffic without the proposed freeway and would experience a greater degradation of traffic performance • During the morning commute, the Broadway Curve would experience longer duration of LOS E and F conditions
What effects would the proposed freeway have on SR 202L (Santan Freeway)?	• Would increase use on the segment near the proposed freeway by 42,000 vpd • Would optimize operation of the remainder of the SR 202L system	• SR 202L near the proposed freeway would remain underused
Would the proposed freeway affect traffic using 51st Avenue through Community[i] land?	• Would reduce traffic from 9,200 vpd in 2012 to 8,100 vpd in 2035, preventing an increase in unwanted traffic cutting through the Community	• Traffic volumes would increase to 11,800 vpd in 2035 • 51st Avenue would continue to be used by unwanted traffic cutting through the Community
What other general transportation effects would the proposed freeway have?	• Would reduce projected traffic volumes on the remaining regional freeway system, Interstate freeways, and local road network • Would provide opportunities for freeway-dependent transit services • Would provide additional opportunities for transportation system management and transportation demand management	• No improvement in performance of the region's freeways, Interstate freeways, and arterial streets would occur • Additional opportunities for regional freeway-dependent transit services, transportation system management, and transportation demand management would not occur
What effects would the proposed freeway have on the area's transportation planning efforts?	• Would fulfill the planning efforts of numerous governmental entities • Would be an integral element and enhance operation of other planned improvements in the *Regional Transportation Plan* • Would fulfill a need first formally acknowledged in 1985	• Lack of the proposed freeway would be inconsistent with the planning efforts of numerous governmental entities • Would not complete the planned improvements in the *Regional Transportation Plan*

[a] Interstate 10 [b] State Route 202L (Loop 202) [c] State Route 30 [d] vehicles per day [e] State Route 101L (Loop 101) [f] State Route 303L (Loop 303) [g] The Broadway Curve is the area of Interstate 10 between 48th Street and Broadway Road; it is the most congested stretch of freeway in the Phoenix metropolitan area. [h] level of service [i] Gila River Indian Community

Summary of Screening Process Results – Alternatives Eliminated and Alternatives Carried Forward

Based on the content in Figure 3-2, Figure 3-19 presents the specific outcomes of the screening process, highlighting those action alternatives carried forward and those eliminated from further study. Prior to issuance of the FEIS, the alternatives development and screening process was reviewed considering changes in existing and forecast population, housing, employment, and traffic. The alternatives development and screening process was validated. As a result of this systematic, multidisciplinary process, three action alternatives (including design options) in the Western Section and one action alternative in the Eastern Section were carried forward for detailed study in the EIS. The combinations of action alternatives from the Western and Eastern Sections represent a range of reasonable alternatives for detailed consideration. The No-Action Alternative was also carried forward.

Figure 3-19 Summary of Action Alternatives Considered and Eliminated



[a] refers to names for technical alternatives in the Western Section (see Tables 3-3 and 3-4) [b] refers to Western Section alternative [c] refers to Eastern Section alternative [d] right-of-way (see box on page 3-20 regarding constrained and unconstrained R/W)
[e] high-occupancy vehicle [f] transportation system management [g] transportation demand management [h] State Route 85 [i] Interstate 8 [j] U.S. Route 60 [k] Interstate 10 (Papago Freeway) [l] Interstate 17 [m] Phoenix South Mountain Park/Preserve [n] an early alternative roughly aligned with 99th Avenue
[o] Gila River Indian Community

Source: Validation of the Alternatives Screening Process at the FEIS Stage

In accordance with the National Environmental Policy Act, a range of reasonable action alternatives to carry forward for further analysis was determined through application of multidisciplinary criteria in a logical, step-wise progression. At the end of each step, modes, corridors, alignments, or options were either eliminated or advanced to the next step. This process was validated prior to issuance of the Final Environmental Impact Statement (see sidebar on page 3-2).

3

How detailed are the designs of the action alternatives?

The level of design when discussed in the context of freeway design is typically addressed in percentages. For example, "100 percent plans" imply the engineering is complete and a contractor can begin freeway construction based on the plans. Any value less than 100 percent indicates that engineers and designers are still formulating design features of the project.

The action alternatives studied in an FEIS must have sufficient design and engineering completed for ADOT to:

- **know the proposed action could be constructed**
- **allow analysts to meaningfully assess and compare impacts that would occur from any of the action alternatives**
- **allow determinations to be made about the proposed action**

At the same time, the level of design should not (for use in the FEIS) inhibit engineers and designers from making minor changes later in the project development process that could lead to optimized performance, project savings, and/or impact reductions.

ALTERNATIVES STUDIED IN DETAIL

NO-ACTION ALTERNATIVE

The No-Action Alternative is included for detailed study in accordance with NEPA requirements to compare beneficial and adverse impacts of the action alternatives with those benefits and consequences (adverse impacts) of not proceeding with one of the action alternatives. The No-Action Alternative would not extend SR 202L (Santan Freeway) west of I-10 (Maricopa Freeway); however, it would include all other projects included in the RTP. Traffic on the existing segment of SR 202L (Santan Freeway) as well as along I-10 would need to use existing Interstate and Regional Freeway and Highway System facilities or the local street network. As described in Chapter 1, *Purpose and Need*, regional traffic volumes are projected to increase substantially. VMT are projected to increase by 50 percent between 2012 and 2035), and the No-Action Alternative would not alleviate projected increases in traffic volumes and congestion on the Interstate and regional freeway systems nor on the arterial street network by the design year 2035. Implementation of the No-Action Alternative would result in:

- ➤ further difficulty in gaining access to adjacent land uses
- ➤ increased difficulty in gaining access to Interstate and regional freeway systems from the local arterial street network
- ➤ increased levels of congestion-related impacts
- ➤ continued degradation in performance of regional freeway-dependent transit services
- ➤ increased trip times and higher user costs

Impacts of the No-Action Alternative are described in Chapter 4, *Affected Environment, Environmental Consequences, and Mitigation*. They are appropriately presented in that chapter to facilitate a comparison of impacts with the action alternatives.

Further, as described in Table 3-9, an important link in the Regional Freeway and Highway System would not be constructed, thereby resulting in increased congestion on completed segments of the Regional Freeway and Highway System. The No-Action Alternative would be inconsistent with MAG and local jurisdictions' long-range planning and policies. For example, both SR 30 and ARS would need to be reassessed in terms of purpose and need and logical termini and be reanalyzed in terms of traffic performance. The No-Action Alternative would not adequately serve transit opportunities because it would preclude future development of HOV lanes, express bus service, and park-and-ride lots adjacent to the proposed action.

The No-Action Alternative would not satisfy the purpose and need of the proposed action (refer to Chapter 1, *Purpose and Need*). Identification of the No-Action Alternative as the Selected Alternative would not preclude a project similar to the proposed action from being proposed.

ACTION ALTERNATIVES

This section presents freeway alternatives studied in detail in the FEIS. It describes design, operational, and cost characteristics of each action alternative to the extent possible, given the level of design conducted for each of the action alternatives (see sidebar regarding design detail, on this page). The same design concepts, principles, standards, and assumptions were applied to all action alternatives.

Horizontal and Vertical Alignments

Figures 3-20 through 3-25 illustrate horizontal and vertical alignments (or profiles) of the action alternatives. The following text supports the information depicted in the figures.

Western Section

In the Western Section, alignment descriptions for the action alternatives begin at their western terminus with I-10 (Papago Freeway) and proceed east to the common point among all action alternatives. Table 3-11 presents additional data pertaining to the Western Section action alternatives (see page 3-48).

W59 Alternative (Preferred Alternative)

Horizontal Alignment: The W59 Alternative would connect to I-10 (Papago Freeway) with a system traffic interchange, which would replace the existing service traffic interchange at 59th Avenue and would convert the existing 59th Avenue to two-lane northbound and southbound frontage roads approximately between Van Buren Street and the RID canal. From I-10 (Papago Freeway), the W59 Alternative would proceed south along the eastern side of 59th Avenue, crossing Roosevelt and Van Buren streets, then shift to the western side, crossing the UPRR tracks and Buckeye Road before making a slight western shift approximately ⅓ mile north of Lower Buckeye Road. The W59 Alternative would then travel south, crossing Lower Buckeye Road, Broadway Road, the Salt River, and Southern Avenue before making a slight shift to the east. The W59 Alternative would continue south, approximately ¼ mile west of 59th Avenue, and would cross Baseline and Dobbins roads. It would continue south and then make a curve transition from the southern to the southeastern direction to cross Elliot Road and connect with the E1 Alternative at the point common to all action alternatives on an alignment parallel and adjacent to the Community boundary.

Vertical Alignment: Beginning at a new system traffic interchange with I-10 (Papago Freeway) at 59th Avenue, the W59 Alternative would start as an elevated facility. The alternative's vertical alignment would be a rolling profile, passing over all arterial streets, railroad tracks, canals, and the Salt River (for additional information, see sidebar on the next page discussing the rolling profile). Between these features, the W59 Alternative would descend toward the existing grade. All arterial streets would remain at their existing elevations, with minor variations. South of the Salt River, the profile would pass over Southern Avenue, Baseline Road, the Laveen Area Conveyance Channel, Dobbins Road, and Elliot Road before connecting to the E1 Alternative.

W71 Alternative

Horizontal Alignment: The W71 Alternative would proceed from a new system traffic interchange with I-10 (Papago Freeway) at 71st Avenue to the south-southeast, crossing Roosevelt Street, Van Buren Street, and the UPRR tracks before turning to the southwest, crossing Buckeye Road at approximately 71st Avenue. In its southwestern direction, the W71 Alternative would curve around the western side of Santa Maria Middle School,

crossing Lower Buckeye Road approximately ¼ mile east of 75th Avenue. South of Lower Buckeye Road, the W71 Alternative would continue to the south, crossing Broadway Road, the Salt River, and Southern Avenue. Just north of Baseline Road, the W71 Alternative would begin the curve transition to the southeastern direction and would cross Baseline Road, the Laveen Area Conveyance Channel, Dobbins Road, and Elliot Road on an alignment parallel and adjacent to the Community boundary. The W71 Alternative would connect with the E1 Alternative at a point common to all action alternatives.

Vertical Alignment: The W71 Alternative would begin as an elevated facility at its system traffic interchange with I-10 (Papago Freeway) and continue as a rolling profile that would pass over all arterial streets, railroad tracks, canals, and the Salt River. Between these features, the W71 Alternative would descend toward the existing grade. All arterial streets would remain at their existing elevations, with minor variations. South of the Salt River, the profile would pass over Southern Avenue, Baseline Road, and the Laveen Area Conveyance Channel. The profile would then dip below the existing grade approximately 10 feet at Dobbins Road (which would be elevated to pass over the freeway). The W71 Alternative would then rise above the existing grade and pass over Elliot Road before connecting to the E1 Alternative.

W101 Alternative and its Options

Horizontal Alignment: Unlike the W59 and W71 Alternatives, the W101 Alternative, as studied in the FEIS, has three horizontal alignment options (see Table 3-10).

Vertical Alignment: The options associated with the W101 Alternative would all have similar vertical alignments. Generally, while the horizontal alignment of SR 101L (Agua Fria Freeway) would be modified beginning at Thomas Road, its vertical alignment would match its existing condition. SR 101L (Agua Fria Freeway) would continue to travel along the existing grade and cross over I-10 approximately 25 feet aboveground.

South of I-10, the W101 Alternative and its Options would have a rolling vertical alignment that would pass over all arterial streets, railroad tracks, canals, and the Salt River. As with the other action alternatives, between these features, the W101 Alternative would descend toward the existing grade. All arterial streets would remain at their existing elevations, with minor variations. South of the Salt River, the profile would pass over Southern Avenue, Baseline Road, and the Laveen Area Conveyance Channel. The profile would then dip below the existing grade approximately 10 feet at Dobbins Road (which would be elevated to pass over the freeway). The W101 Alternative would then rise above existing grade and pass over Elliot Road before connecting to the E1 Alternative. Table 3-11 on page 3-48 presents additional data pertaining to the action alternatives in the Western Section.

Why use a rolling profile?

The use of the "rolling" profile is evident in other existing freeways in the MAG region. Good examples of the profile can be seen on portions of SR 101L (Agua Fria and Pima freeways). The concept can:

- **be cost-effective**
- **balance costs associated with the export and import of fill materials**
- **provide operational benefits because it is a common feature on the region's freeways and drivers are, therefore, familiar with it**

Rolling profiles are also beneficial in that they permit efficient drainage solutions and reduce the amount of land acquisition needed.

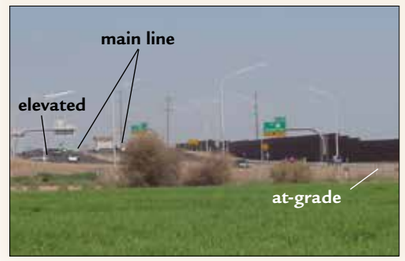
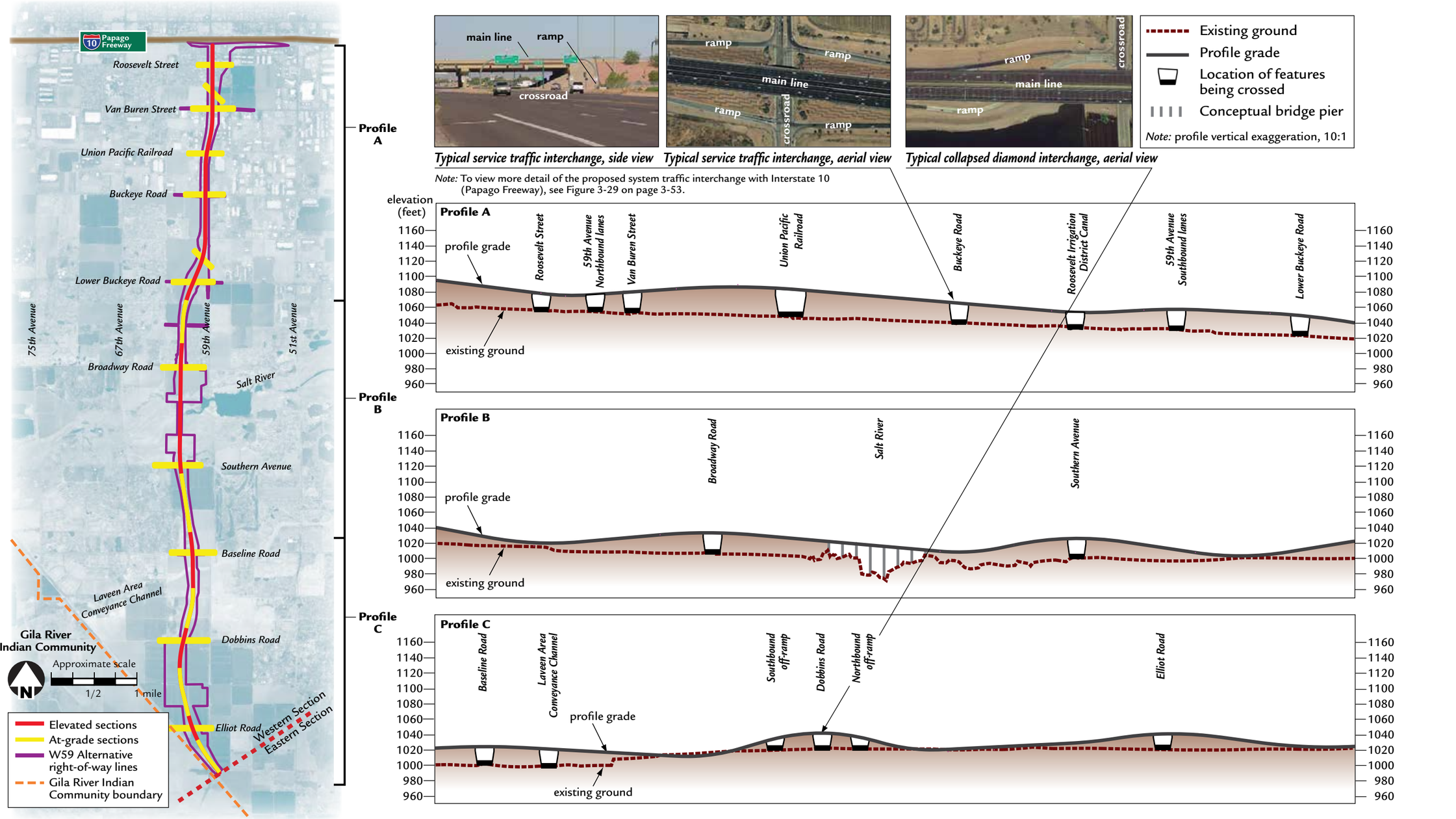


Table 3-10 Horizontal Alignments, W101 Alternative and Options, Western Section

Alternative Option[a]	Horizontal Alignment Description	I-10[b] Connection Comments
W101 Alternative Western Option	The Western Option would proceed from a new system traffic interchange with I-10 (Papago Freeway) and SR 101L[c] (Agua Fria Freeway) in a southerly direction across Roosevelt Street, Van Buren Street, UPRR[d] tracks, Buckeye Road, and Lower Buckeye Road before transitioning to an east-southeasterly direction. After crossing 91st Avenue just south of Broadway Road, the Western Option would head southeasterly to cross the Salt River, Baseline Road, the Laveen Area Conveyance Channel, Dobbins Road, and Elliot Road on an alignment parallel and adjacent to the Gila River Indian Community boundary. The Western Option would connect to the E1 Alternative at the point common to all action alternatives.	Each alignment option (Western, Central, or Eastern) for the W101 Alternative would connect to I-10 (Papago Freeway) at the I-10/SR 101L (Agua Fria Freeway) system traffic interchange. For each option, the connection would be made by partially reconstructing the existing traffic interchange or by fully reconstructing the interchange. One design difference between the Partial Reconstruction and Full Reconstruction variants of any of the options relates to horizontal alignment of a segment of the proposed action. The Partial Reconstruction variant would cross approximately 230 feet west of the existing interchange location; the Full Reconstruction variant would cross approximately 700 feet west of the existing interchange location (*W101 Alternative, Partial Reconstruction or Full Reconstruction of the Existing System Interchange Memorandum,* 2006), see sidebar on page 3-2.
W101 Alternative Central Option	The Central Option would proceed from a new system traffic interchange with I-10 (Papago Freeway) and SR 101L (Agua Fria Freeway) in a southerly direction along the same alignment as the Western Option until just south of Van Buren Street. South of Van Buren Street, the Central Option would turn to the southeast, crossing the UPRR tracks and Buckeye Road, and then turn south after crossing 91st Avenue. Prior to reaching Broadway Road, the Central Option would turn to the southeast across Broadway Road. The Central Option would then follow the same alignment as the Western Option until connecting with the E1 Alternative at the point common to all action alternatives.	
W101 Alternative Eastern Option	The Eastern Option would proceed from a new system traffic interchange with I-10 (Papago Freeway) and SR 101L (Agua Fria Freeway) in a southerly direction along the same alignment as the Western Option until just south of Van Buren Street. South of Van Buren Street, the Eastern Option would turn to the southeast, crossing the UPRR tracks, Buckeye Road, 91st Avenue, Lower Buckeye Road, 83rd Avenue, and Broadway Road. South of Broadway Road, the Eastern Option would follow the same alignment as the Western Option until connecting with the E1 Alternative at the point common to all action alternatives.	

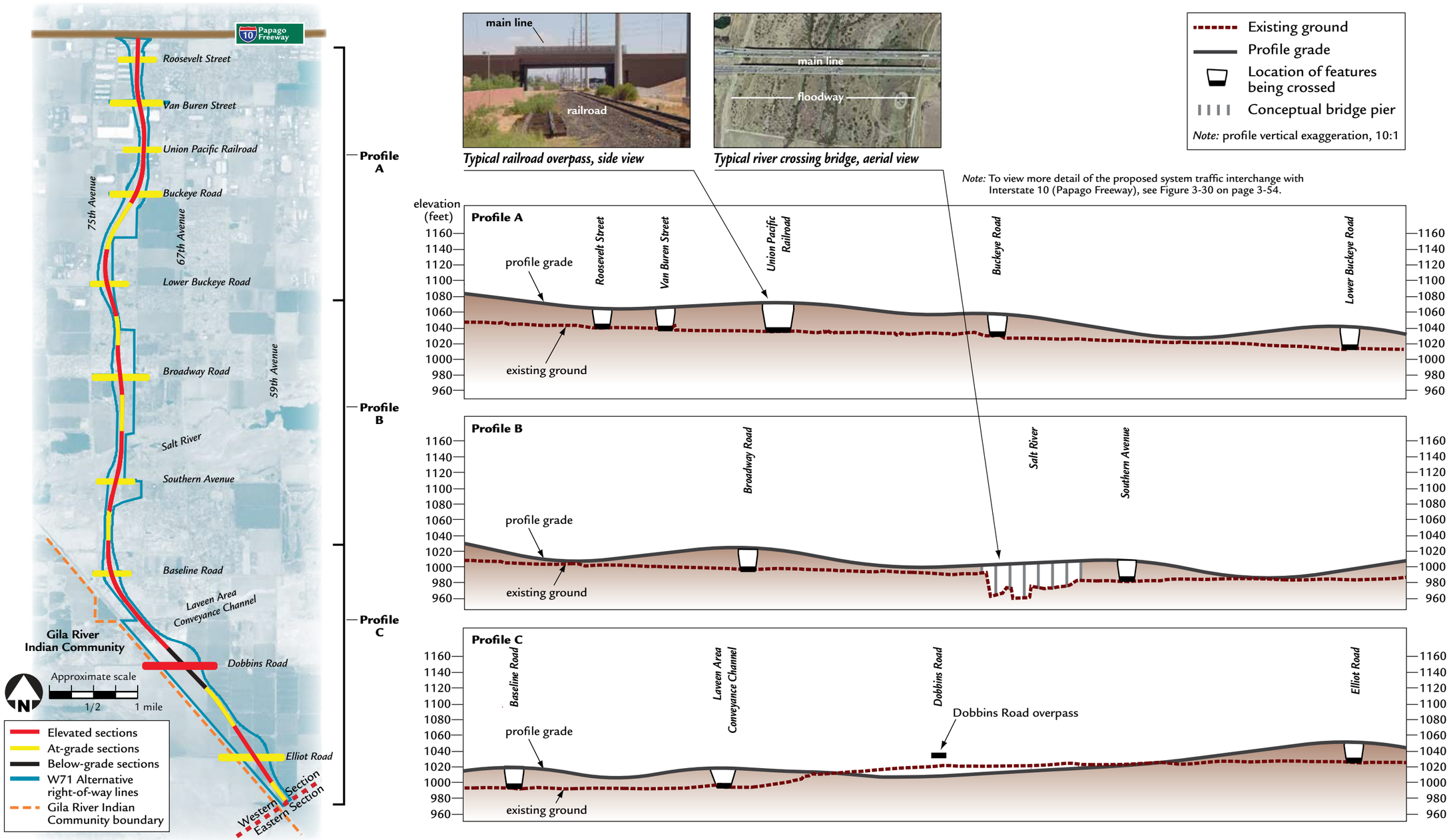
[a] Each W101 Alternative option would require SR 101L (Agua Fria Freeway) realignment for approximately 1.25 mile between Thomas Road and Interstate 10 (Papago Freeway).
[b] Interstate 10 [c] State Route 101L (Loop 101) [d] Union Pacific Railroad

Figure 3-20 Horizontal and Vertical Alignments, W59 Alternative, Western Section



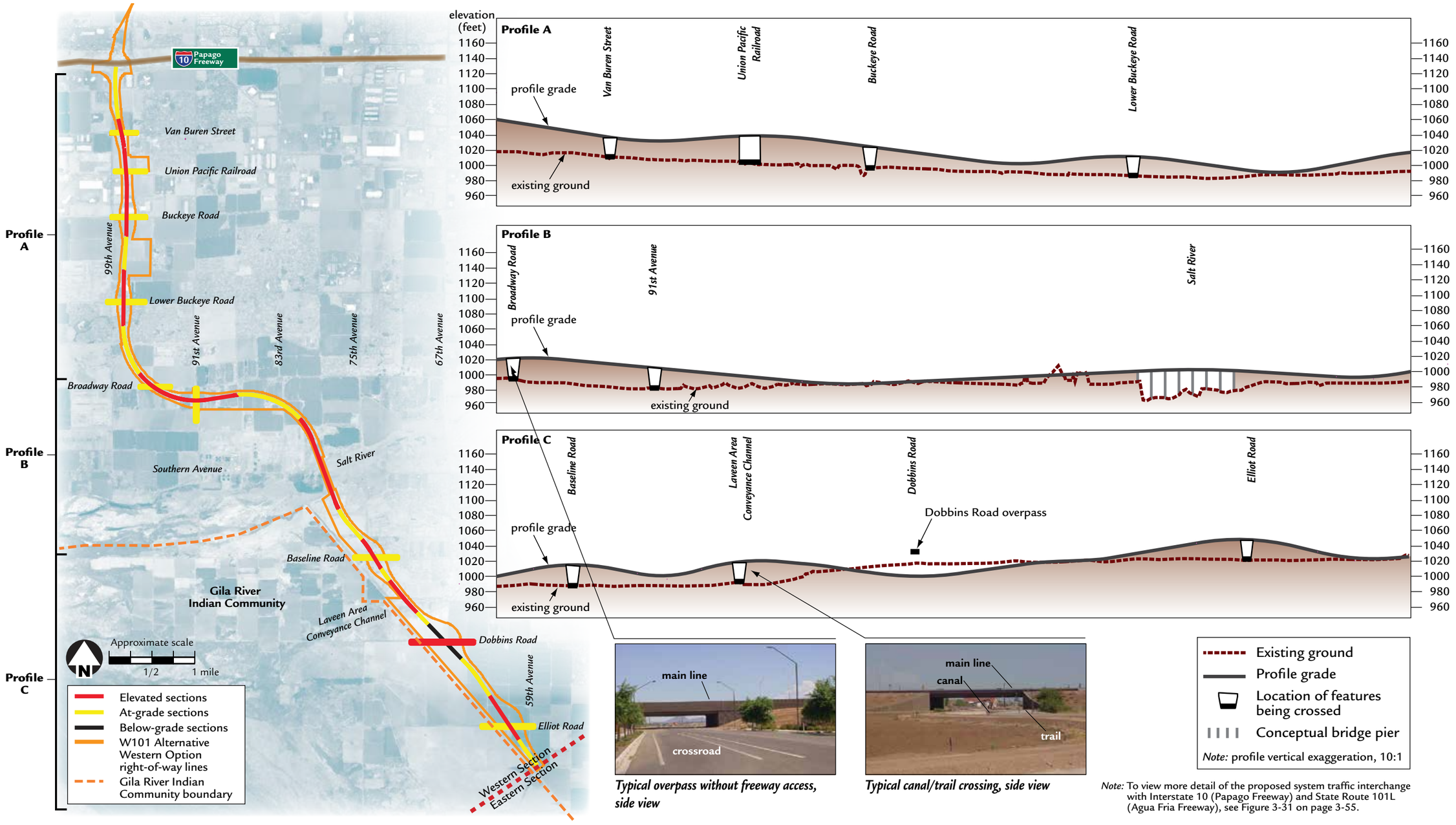
Physical features (e.g., railroads, canals, the Salt River, arterial streets, groundwater levels) and the desire to balance earthwork and limit impacts on existing streets resulted in a rolling profile for the W59 Alternative. (The bulges and other irregular shapes depicted for the alternative's otherwise-linear footprint reflect projected right-of-way needed for drainage basins and channels, etc.)

Figure 3-21 Horizontal and Vertical Alignments, W71 Alternative, Western Section



Like the W59 Alternative, physical features (e.g., railroads, canals, the Salt River, arterial streets, groundwater levels) and the desire to balance earthwork and limit impacts on existing streets resulted in a rolling profile for the W71 Alternative. At Dobbins Road, the profile would be "depressed" below existing ground; because of terrain slope, water—when on the freeway—would flow toward the Salt River without requiring a pump station. (The bulges and other irregular shapes depicted for the alternative's otherwise-linear footprint reflect projected right-of-way needed for drainage basins and channels, interchanges, etc.)

Figure 3-22 Horizontal and Vertical Alignments, W101 Alternative Western Option, Western Section



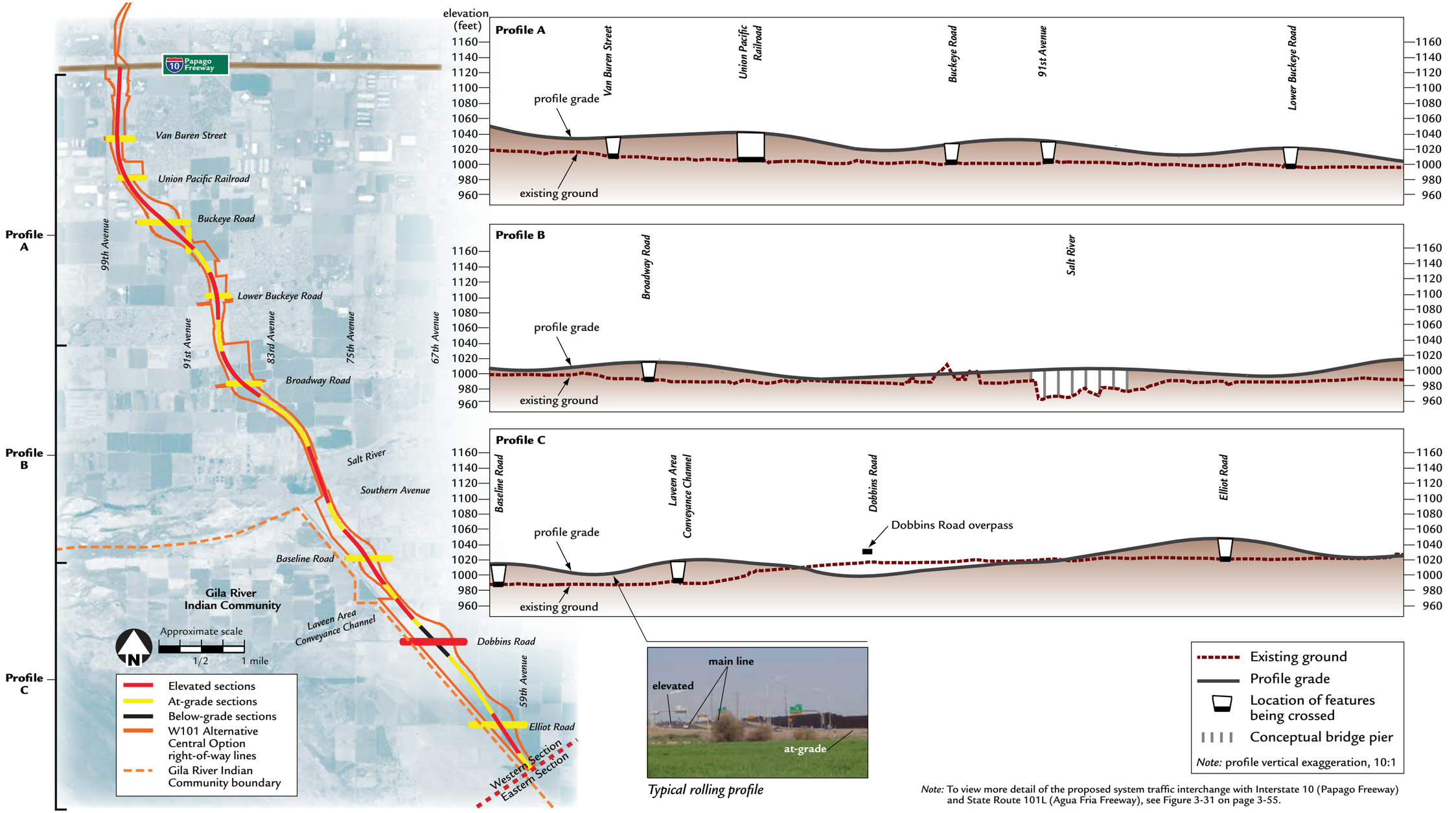
Typical overpass without freeway access, side view

Typical canal/trail crossing, side view

Note: To view more detail of the proposed system traffic interchange with Interstate 10 (Papago Freeway) and State Route 101L (Agua Fria Freeway), see Figure 3-31 on page 3-55.

The same physical features associated with the W59 and W71 Alternatives (e.g., railroads, canals, the Salt River, arterial streets, groundwater levels) and the desire to balance earthwork and limit impacts on existing streets resulted in a rolling profile for the W101 Alternative Western Option. At Dobbins Road, the profile would be "depressed" below existing ground; because of terrain slope, water—when on the freeway—would flow toward the Salt River without requiring a pump station. (The bulges and other irregular shapes depicted for the alternative's otherwise-linear footprint reflect projected right-of-way needed for drainage basins and channels, interchanges, etc.)

Figure 3-23 Horizontal and Vertical Alignments, W101 Alternative Central Option, Western Section

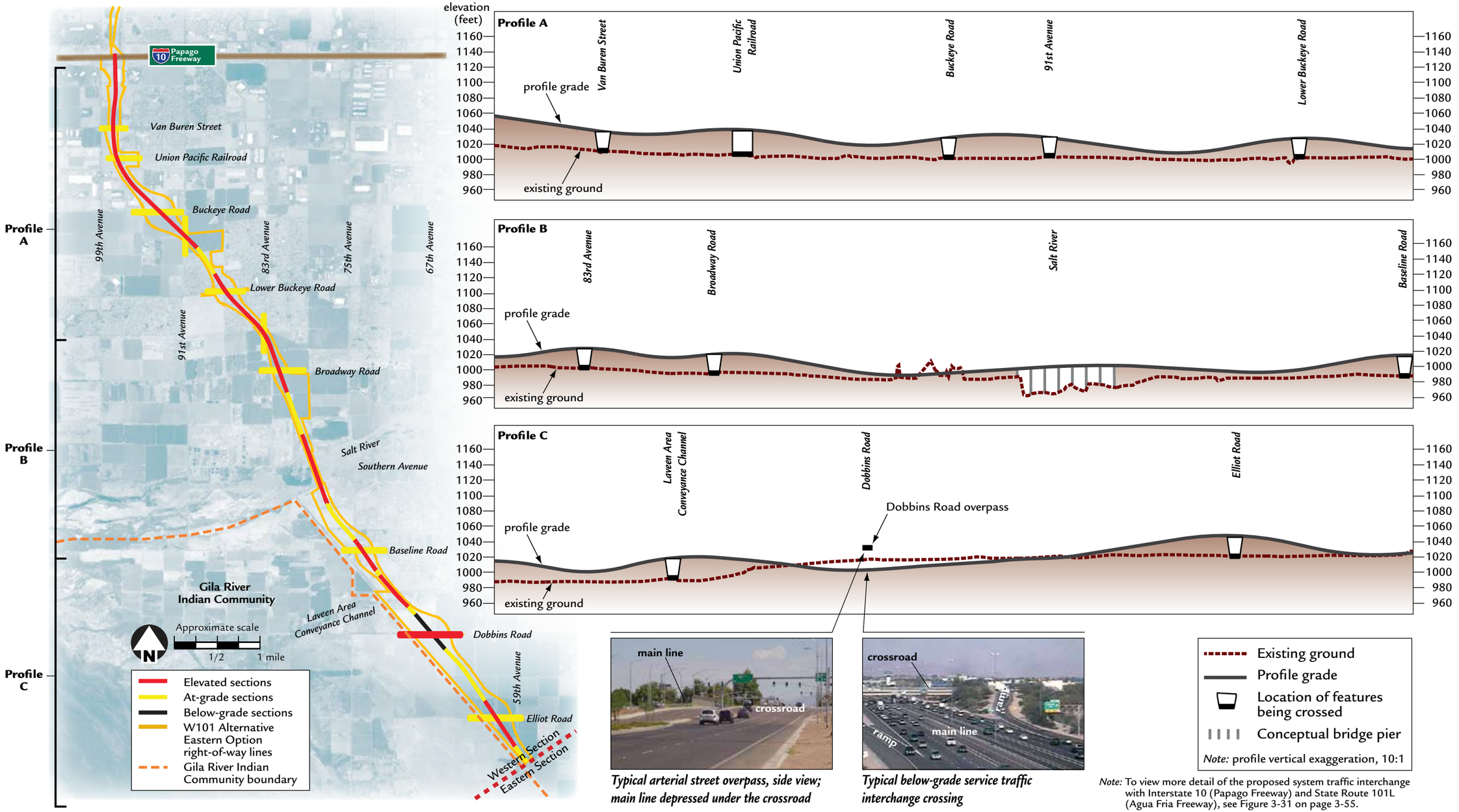


Note: To view more detail of the proposed system traffic interchange with Interstate 10 (Papago Freeway) and State Route 101L (Agua Fria Freeway), see Figure 3-31 on page 3-55.

The same physical features associated with the W59 and W71 Alternatives (e.g., railroads, canals, the Salt River, arterial streets, groundwater levels) and the desire to balance earthwork and limit impacts on existing streets resulted in a rolling profile for the W101 Alternative Central Option. At Dobbins Road, the profile would be "depressed" below existing ground; because of terrain slope, water—when on the freeway—would flow toward the Salt River without requiring a pump station. (The bulges and other irregular shapes depicted for the alternative's otherwise-linear footprint reflect projected right-of-way needed for drainage basins and channels, interchanges, etc.)

3

Figure 3-24 Horizontal and Vertical Alignments, W101 Alternative Eastern Option, Western Section



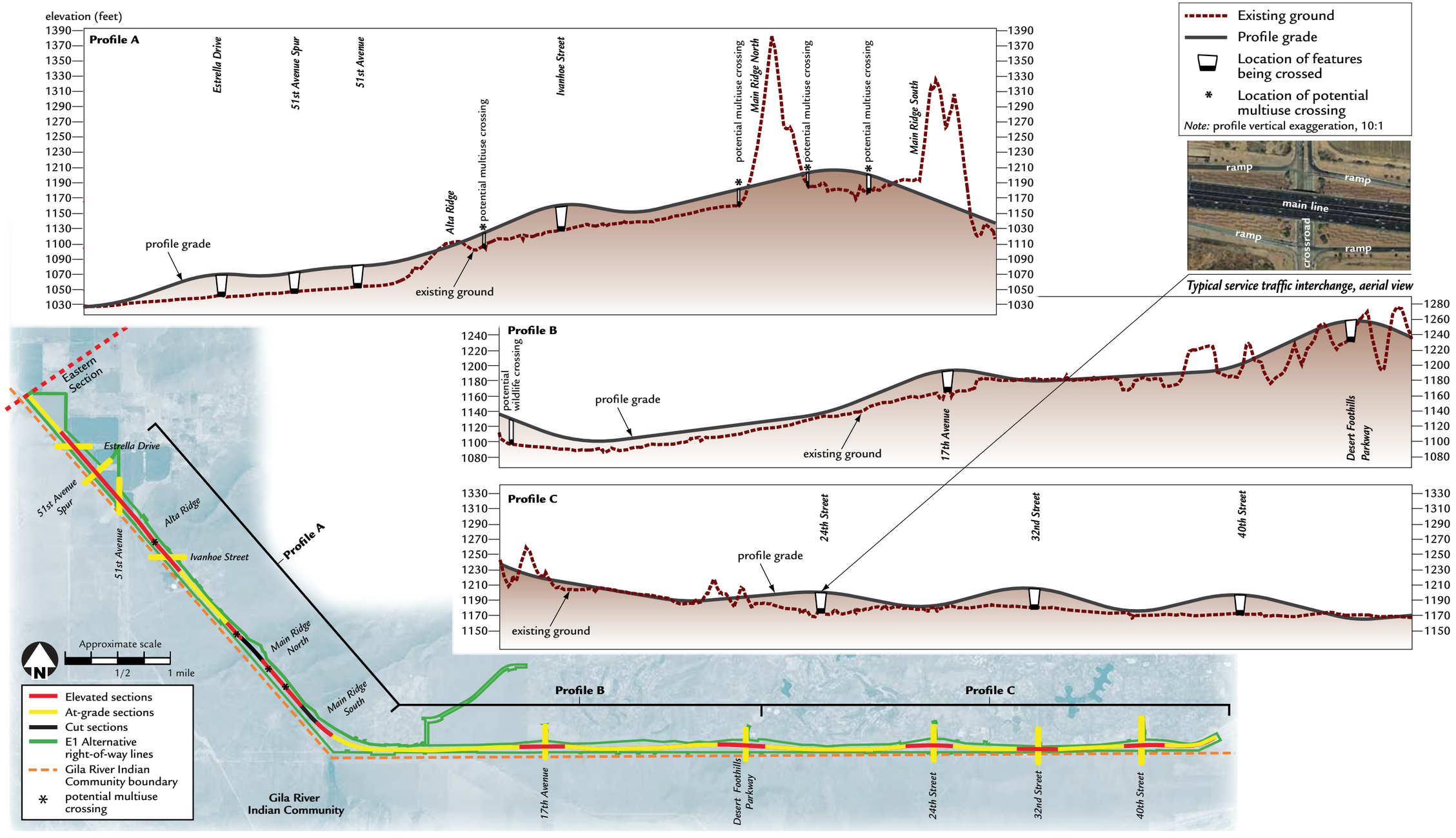
Typical arterial street overpass, side view; main line depressed under the crossroad

Typical below-grade service traffic interchange crossing

Note: To view more detail of the proposed system traffic interchange with Interstate 10 (Papago Freeway) and State Route 101L (Agua Fria Freeway), see Figure 3-31 on page 3-55.

The same physical features associated with the W59 and W71 Alternatives (e.g., railroads, canals, the Salt River, arterial streets, groundwater levels) and the desire to balance earthwork and limit impacts on existing streets resulted in a rolling profile for the W101 Alternative Eastern Option. At Dobbins Road, the profile would be depressed below existing ground; because of terrain slope, water—when on the freeway—would flow toward the Salt River without requiring a pump station. (The bulges and other irregular shapes depicted for the alternative's otherwise-linear footprint reflect projected right-of-way needed for drainage basins and channels, interchanges, etc.)

Figure 3-25 Horizontal and Vertical Alignments, E1 Alternative, Eastern Section



The E1 Alternative would follow a rolling profile, similar to the Western Section action alternatives, for its entirety. Through the mountainous areas, the profile would be elevated to allow natural washes to flow under, for possible wildlife crossings, and for access to the mountains (see text box on page 4-137). A "depressed" profile (below existing ground) when replacing Pecos Road would not be reasonable (see related text beginning on page 3-15). (The bulges and other irregular shapes depicted for the alternative's otherwise linear footprint reflect projected right-of-way needed for drainage basins and channels, interchanges, etc.)

3

Eastern Section

The alignment of the one action alternative in the Eastern Section is described below. Figure 3-25 is a graphic representation of its horizontal and vertical alignment.

E1 Alternative (Preferred Alternative)

Horizontal Alignment: At the point common among all action alternatives, the E1 Alternative would travel to the southeast parallel and adjacent to the Community boundary, crossing over Estrella Drive, 51st Avenue, and Ivanhoe Street. In this direction, the action alternative would pass through three ridges of the South Mountains (two of which are in SMPP) before turning to the east. Traveling to the east, the E1 Alternative would follow and replace the Pecos Road alignment north of and adjacent to the Community boundary, and would cross over 17th Avenue, Desert Foothills Parkway, 24th Street, 32nd Street, and 40th Street. The E1 Alternative would then connect to the existing I-10 (Maricopa Freeway)/SR 202L (Santan Freeway)/Pecos Road system traffic interchange. Table 3-11 presents additional data pertaining to the E1 Alternative.

Vertical Alignment: The E1 Alternative would have a rolling profile similar to those typical of the Western Section action alternatives and would pass over all arterial streets. Between arterial street overpasses, the E1 Alternative would descend toward the existing grade. In the mountainous region, the profile would remain adequately elevated to facilitate possible wildlife passage through proposed multiuse crossings (see the section, *Biological Resources*, beginning on page 4-125, for more details) and to avoid interrupting the natural drainage. All arterial streets would remain at their existing elevations, with minor variations. Three cut sections would be required where mountain ridges exist (one ridge is outside SMPP) (see the section, *Topography, Geology, and Soils*, beginning on page 4-121, and the section, *Measures to Minimize Harm*, beginning on page 5-23). Between 17th Avenue and 24th Street near Ahwatukee Foothills Village, other cut sections would also be required. The E1 Alternative would end near 46th Street.

The E1 Alternative would have no depressed sections, except through the cut sections mentioned above (see section, *E1 Alternative – Pecos Road Variations*, beginning on page 3-15, regarding Pecos Road profile options).

Table 3-11 Alignment Features, Action Alternatives

Alignment Feature	Action Alternative					
	Western Section					Eastern Section
	W59	W71	W101 Options[a]			E1
			Western	Central	Eastern	
Length (miles)[b]	8.5	9.0	11.3	10.9	10.8	13.1
Crossings						
Arterial streets[c]	10	9	11	12	12	9
Railroads	All alternatives would cross UPRR[d] facilities.					Not applicable
Natural features	All would cross the Salt River.					Three mountain ridgelines
Canal/Drainages	All would cross Roosevelt Canal and Laveen Area Conveyance Channel.					Numerous natural washes
I-10[e] improvements[f]	From 43rd to 75th avenues	From 51st to 91st avenues	From 75th Avenue to Dysart Road			None required
SR 101L[g] (Agua Fria Freeway) improvements	None required		I-10 (Papago Freeway) to Bethany Home Road			Not applicable
Common connection	Western Section action alternatives would connect to the Eastern Section action alternative at a point common to all action alternatives on an alignment parallel and adjacent to the Gila River Indian Community boundary (see text box on page 3-8).					

[a] Each of the W101 Alternatives and Options includes proposals to either reconstruct the Interstate 10/State Route 101L system traffic interchange to connect the proposed action or to construct a new system traffic interchange approximately 700 feet to the west of the existing interchange (which, for this proposal, would include demolition of the existing interchange).
[b] When Western and Eastern Section action alternatives are combined, the entire length of the proposed action (Western and Eastern Sections) would be between 21.6 and 24.4 miles.
[c] Refer to Figures 3-20 to 3-25 for specific arterial street crossings.
[d] Union Pacific Railroad
[e] Interstate 10
[f] Most improvements to I-10 (Papago Freeway) in the Western Section would occur within its existing right-of-way (see Figures 3-29 through 3-31).
[g] State Route 101L (Loop 101)

Other Alignment Features

Table 3-11 provides a comparison of alignment features of the action alternatives. For action alternatives in the Western Section, primary differences focus on the connections to I-10 (Papago Freeway) and related improvements that would be required on I-10 (operational differences are presented later in this chapter). The same design concepts and principles were applied to all action alternatives. Options to change the profile of the E1 Alternative along Pecos Road (e.g., to depress the portion of freeway below the existing grade) were examined. The profile depicted was found to represent the best balance between cost and impact on the surrounding environment.

Traffic Interchange Configurations

Two types of traffic interchanges (see sidebar on page 3-14) are included as part of the action alternatives:

- System traffic interchanges are interchanges connecting a freeway with another freeway, such as the I-10/I-17 system traffic interchange in downtown Phoenix.
- Service traffic interchanges are interchanges providing freeway access to and from the local arterial street network, such as I-10 at 7th Avenue in downtown Phoenix.

The footprint of a system traffic interchange is typically much larger than that of a service traffic interchange.

System Traffic Interchanges

Two connections to existing freeways would occur, one at each end of the proposed action and representing the logical termini.

System Traffic Interchange at the Western Terminus

The proposed action (using the W59, W71, or W101 Alternative) would connect to I-10 (Papago Freeway) at one of three locations and would represent the proposed action's western terminus. Proposed configuration concepts for each connection to I-10 (Papago Freeway) follow.

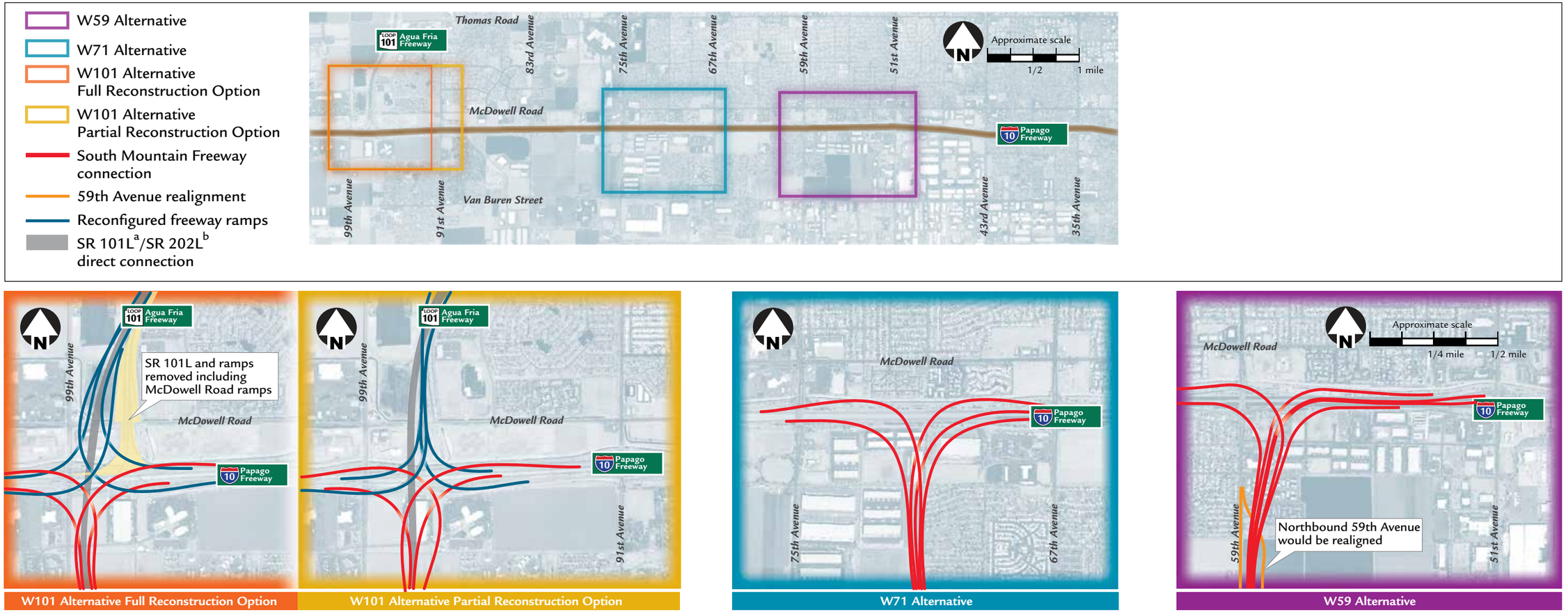
W59 Alternative (Preferred Alternative) and W71 Alternative – System Traffic Interchange

The W59 and W71 Alternatives would each tie into I-10 (Papago Freeway) using a similarly configured system traffic interchange and are, therefore, described together. Figure 3-26 illustrates the system traffic interchange

concept for the W59 and W71 Alternatives. Additional information in support of Figure 3-26 includes:

- For either alternative, the interchange would include four freeway-to-freeway ramps connecting the proposed action to I-10.
- For northbound traffic on the proposed action, four lanes would be provided approaching the system traffic interchange. The lanes would diverge, with two lanes forming the northbound-to-eastbound interchange ramp and two lanes forming the northbound-to-westbound interchange ramp.
- For traffic heading south on the proposed action from I-10, an eastbound-to-southbound ramp and a westbound-to-southbound ramp would be provided. For eastbound-to-southbound traffic, two I-10 eastbound lanes would diverge, forming a ramp, and for westbound-to-southbound traffic, two I-10 westbound lanes would diverge to form another ramp. Similarly, the southbound movement of the proposed action would be four lanes wide.
- All freeway-to-freeway ramps would have two lanes with left and right shoulders.
- Access to and from existing service traffic interchanges on I-10 east and west of the system traffic interchange location would be altered by either action alternative (additional information regarding how local access on I-10 would be altered is provided in the section, *Alteration of Existing Service Traffic Interchanges*, on page 3-52).
- I-10 east and west of the system traffic interchange would be widened to accommodate additional traffic from the connection to the proposed freeway.

Figure 3-26 System Traffic Interchange Configurations, Action Alternatives, Western Section



[a] State Route 101L (Loop 101) [b] State Route 202L (Loop 202) (proposed action)

Under any of the system traffic interchange connections between the proposed action and Interstate 10 (Papago Freeway), ramp configurations would be designed to ensure acceptable traffic operational characteristics on the freeways in the vicinity of the interchange.

- An HOV direct connection ramp between I-10 and the proposed freeway would be provided for traffic traveling north-to-east and west-to-south.

W101 Alternative and its Options – System Traffic Interchange

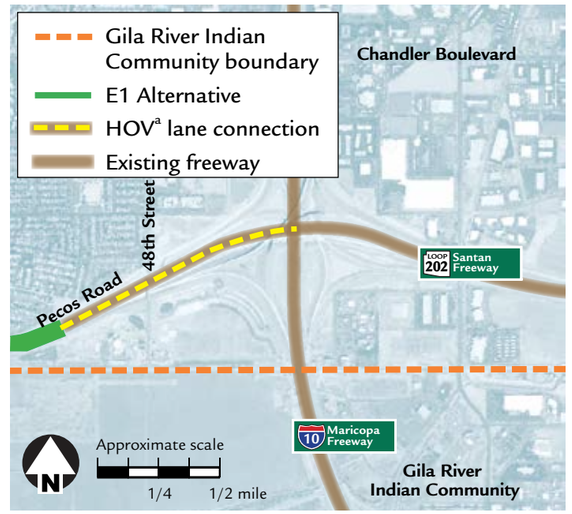
The W101 Alternative would tie into I-10 (Papago Freeway) and SR 101L (Agua Fria Freeway) using a system traffic interchange. Under the options being considered, the existing I-10/SR 101L (Agua Fria Freeway) system traffic interchange would be either partially reconstructed or fully reconstructed. Although the impacts and issues are different for each type of traffic interchange, they each have pros and cons. There were not significant enough differences related to traffic operations, costs, impacts, etc., to eliminate one or the other. Leading into the 2006 identification of the preliminary preferred alternative in the Western Section, ADOT preferred the partial reconstruction because it would keep most of the existing interchange in place. Figure 3-26 depicts schematics of the system traffic interchange concepts for the W101 Alternative and its Options. The main advantage of the connection to I-10 at the existing system traffic interchange is its ability to convey north–south traffic directly onto SR 101L (Agua Fria Freeway) without having it merge onto and then off of I-10 (Papago Freeway). Additional information in support of the concepts shown in Figure 3-26 includes:

- The configurations would include eight freeway-to-freeway ramps, four connecting the existing SR 101L (Agua Fria Freeway) to I-10 (Papago Freeway) and four connecting the proposed action to I-10.
- Northbound traffic on the proposed action would travel on seven general purpose lanes and one HOV lane approaching the system traffic interchange. Four lanes would diverge from the main line: two lanes to form the northbound-to-eastbound ramp and two lanes to form the northbound-to-westbound ramp. The remaining three general purpose lanes and one HOV lane would continue through the system traffic interchange to connect with SR 101L (Agua Fria Freeway).
- Southbound traffic approaching the proposed action on SR 101L (Agua Fria Freeway) would travel on seven general purpose lanes and one HOV lane approaching the system traffic interchange. A portion of SR 101L (Agua Fria Freeway) would be reconstructed to accommodate the connection to SR 202L (proposed action). Four lanes would diverge from the main line: two lanes to form the southbound-to-eastbound ramp and two lanes to form the southbound-to-westbound ramp. The remaining three general purpose lanes and one HOV lane would continue through the system traffic interchange to connect with the main line of the proposed action.
- As with the W59 and W71 Alternatives, each freeway-to-freeway ramp to and from the proposed action would have two lanes with left and right shoulders.
- Two concepts relative to constructing the system traffic interchange are being considered:
  - One concept would modify the existing I-10/SR 101L system traffic interchange (a partial reconstruction).
  - The other concept would construct a new system traffic interchange to the west of the existing system interchange and would remove the existing system traffic interchange (a full reconstruction).
- Access to and from existing service traffic interchanges on I-10 (Papago Freeway) east and west of the system traffic interchange location and on SR 101L (Agua Fria Freeway) north of I-10 to the SR 101L/Thomas Road service traffic interchange would be altered (additional information regarding how local access on I-10 would be altered is provided in the section, *Alteration of Existing Service Traffic Interchanges*).
- I-10 east and west of the system traffic interchange would be widened to accommodate additional traffic from the connection to the proposed freeway.

System Traffic Interchange at the Eastern Terminus

The proposed action (under the E1 Alternative) would connect to the existing I-10 (Maricopa Freeway)/SR 202L (Santan Freeway)/Pecos Road system traffic interchange (the E1 Alternative would replace the Pecos Road connection). The system traffic interchange

Figure 3-27 System Traffic Interchange Configuration, Action Alternative, Eastern Section



[a] high-occupancy vehicle

As was planned when the system traffic interchange was designed, the E1 Alternative would replace the Pecos Road connection to Interstate 10. The general purpose lanes would connect to the existing lanes approximately ¼ mile west of 48th Street, while the HOV lanes would be extended to connect to the existing HOV lanes at the center of the system traffic interchange.

was constructed in 2000–2002 to accommodate the western leg of SR 202L—the proposed action—as depicted in Figure 3-27. ADOT recently completed construction of a direct HOV connection between I-10 (to and from the north) and SR 202L (Santan Freeway) (to and from the east) along with HOV lanes along the SR 202L (Santan Freeway) corridor. The HOV lanes for the proposed action would be extended to connect to the HOV lanes along SR 202L (Santan Freeway).

As a result of traffic analyses coordinated among the RTP-planned projects associated with the system traffic interchange, the northbound-to-westbound and eastbound-to-southbound ramps would be widened from one to two lanes in each direction to accommodate projected 2035 traffic. The E1 Alternative includes

provisions for the proposed ramp widening, which would be constructed as a part of a future project.

System Traffic Interchange at SR 30

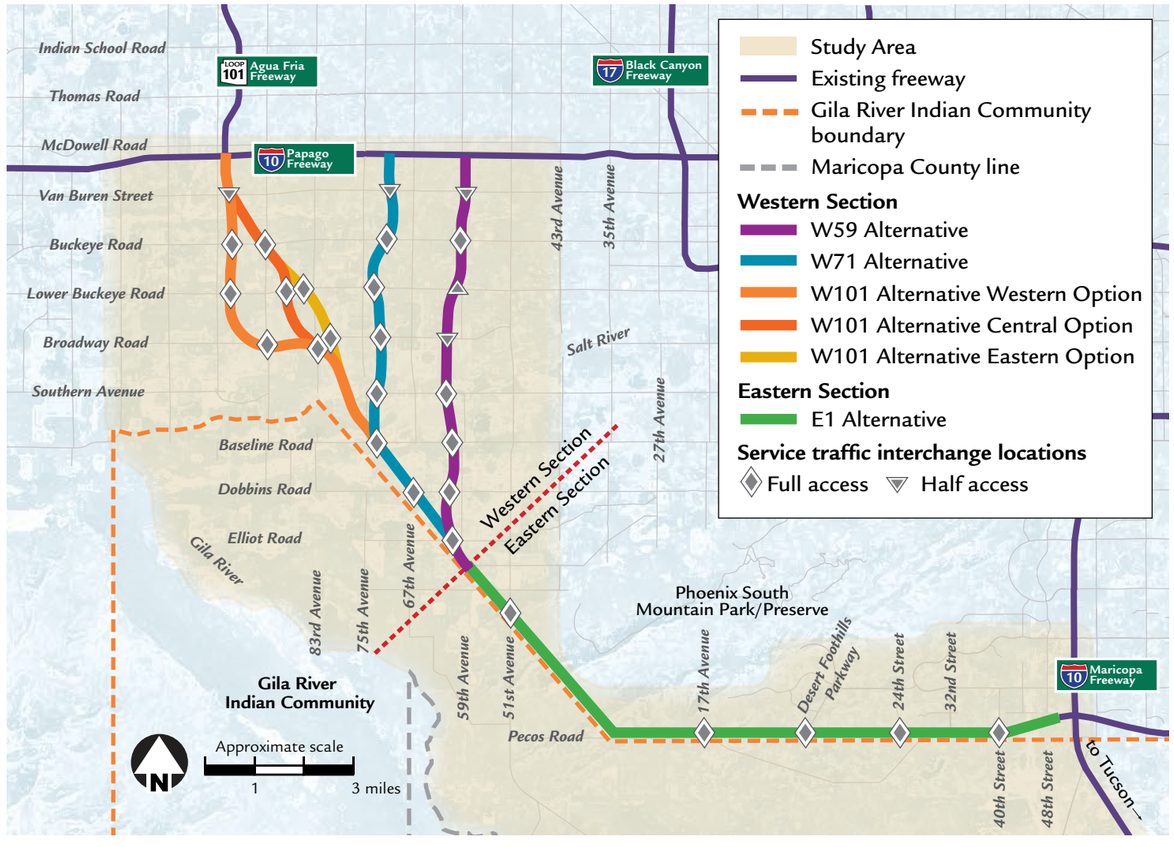
The proposed action would be designed to accommodate a future system traffic interchange to be located in the Western Section near Broadway Road. The interchange would connect SR 30 and ARS to the proposed action. The specific location of the interchange would be determined based on the action alternative identified in the Western Section for the proposed action and on final determinations made for the design and location of SR 30, which is under study. The design and operational characteristics of the system traffic interchange and the potential benefits and adverse impacts of the interchange will be reported in the project studies when made available to the public.

Service Traffic Interchanges – Proposed Action Main Line

The action alternatives would include the construction and operation of service traffic interchanges to provide access between the arterial streets and the proposed freeway. Figure 3-28 illustrates the locations and access proposed for the service traffic interchanges. Additional information in support of the concepts shown in Figure 3-28 includes:

- Service traffic interchanges were generally spaced at 1-mile intervals along the arterial street grid. The spacing is consistent with other freeway facilities in the MAG region. Some locations were not conducive to the 1-mile spacing because of geographic features, operational characteristics, or design limitations (e.g., the arterial street crossing location did not conform to the 1-mile grid).
- Members of the public and local jurisdictions influenced the locations, configuration concepts, and access of some of the service traffic interchanges (see Figures 3-7 and 3-8).
- Environmental, operational, and/or design considerations would determine the level of access to be provided at each service traffic interchange. Most service traffic interchanges would provide full access (ramps in all four directions). Half-diamond (half-access) interchanges would be used near system traffic interchanges to avoid undesirable operational conflicts.
- The diamond interchange configuration (see sidebar on page 3-14) was used to evaluate service traffic interchange needs. The configuration has been commonly used for other freeway facilities in the MAG region. The actual configuration(s) of the service traffic interchanges would be determined during the design phase of the Selected Alternative, if an action alternative were to be identified. Designers would assess whether other configurations (e.g., the single-point urban interchange, collapsed diamond interchange, or split diamond interchange) would be more cost-effective, have smaller R/W needs, and/or have less impact while providing adequate or better operational benefits than the diamond configuration. R/W needs for the proposed action, as calculated in the FEIS and as presented in the section, *Right-of-way Needed for Action Alternatives*, beginning on the next page, would consider sufficient area to accommodate other service traffic interchange types, should public benefit be derived from changing the configurations during the design phase.

Figure 3-28 Proposed Service Traffic Interchanges, Action Alternatives, Western and Eastern Sections



Spacing and design of service traffic interchanges on the proposed freeway would follow patterns similar to those used throughout the region's freeway system. Connection to the service traffic interchanges bordered by Gila River Indian Community (Community) land from the Community would be the responsibility of the Community, in coordination with appropriate jurisdictions.

- On- and off-ramps at the service traffic interchanges would include one lane with left and right shoulders. Additional lanes as warranted by traffic projections would be provided to accommodate turning movements at the crossroad.
- Access control would be maintained along the arterial street to ensure desirable traffic performance.
- To avoid traffic operational problems, two-lane on- and off-ramps would not be used at closely spaced service traffic interchanges.

Alteration of Existing Service Traffic Interchanges

Each action alternative in the Western Section would introduce a large system traffic interchange to a segment of I-10 (Papago Freeway) that now has a series of service traffic interchanges at 1-mile intervals. The size of the system traffic interchange would affect access to and from I-10 from neighboring service traffic interchanges. As a result, modifications to local access would adversely affect nearby businesses, emergency response times, bus routes, arterial street operational characteristics, and freeway conditions. Conversely, local access by way of service traffic interchanges located too close to a system traffic interchange would adversely affect the operational and safety characteristics of the freeway main lines. Because of these potential impacts, various concepts using half-diamond interchanges connected to adjacent half- or full-diamond interchanges with access roads were developed to examine the balance between local access and main line operation.

Figures 3-29 and 3-30 illustrate the local access concepts determined for the W59 and W71 Alternatives, respectively. Figure 3-31 on page 3-55 depicts the concepts applied to the Partial and Full Reconstruction Options for the W101 Alternative and its Options. Effects of the local access concept for each action alternative on local businesses are presented in the section, *Economic Impacts*, beginning on page 4-56. In summary, for each concept, the effects of different combinations of ramp configurations (e.g., braided ramps), ramp lengths, access roads (parallel to I-10), and modifications to the service traffic interchange ramps were examined.

Alteration of Existing Local Street Network

Each action alternative would affect several segments of the existing local street network (accounted for in the R/W presented in Figures 3-20 to 3-25). Alteration of the local street network (principally immediately adjacent to the action alternatives) would be subject to modification during design refinement in future project development phases. An example of how the local street network could be reconfigured using the W59 and E1 Alternatives (Preferred Alternative) is shown in Figures 3-32 and 3-33, respectively (see pages 3-56 and 3-57). A similar approach was used in determining the needed R/W for the W71 Alternative and the W101 Alternative and its Options.

Various approaches could be used in the reconfiguration of the local street network. Examples of these approaches are:

- **Removed street** – As shown in Detail A of Figure 3-32, Latham Street would be removed. No additional reconfiguration would be needed.
- **Newly constructed street** – As shown in Detail B of Figure 3-32, 62nd Avenue would be removed from its existing location and reconstructed farther west. 62nd Avenue would continue to connect Encinas Lane, Wood Street, and Pueblo Avenue.
- **Existing street remaining below freeway** – As shown in Detail A of Figure 3-32, Roosevelt Street would remain in its existing location and bridges would be constructed over it.
- **Newly constructed street** – As shown in Detail C of Figure 3-33, construction of Chandler Boulevard between approximately 27th and 19th avenues would be completed as a part of this project.

Right-of-way Needed for Action Alternatives

Table 3-12 presents the R/W needed for the action alternatives. Information to support the Table 3-12 presentation includes:

- The typical R/W width would vary throughout the project area, but would normally be less than 500 feet wide, except at interchange locations (see the section, *Typical Freeway Sections*, on page 3-58).
- Where service traffic interchanges would be constructed, additional R/W would be provided for the interchange ramps. Based on the angle at which the proposed action would cross the arterial street, additional R/W width for service traffic interchange ramps and lanes would vary between approximately 850 and 2,200 feet.
- R/W and access control would be needed along arterial streets when additional lanes were needed at the service traffic interchanges (the additional R/W needs on the arterial streets have been accounted for in the impact analyses presented in Chapter 4, *Affected Environment, Environmental Consequences, and Mitigation*).

R/W would also be needed for the system traffic interchange connecting the proposed action to I-10 (Papago Freeway) in the Western Section.

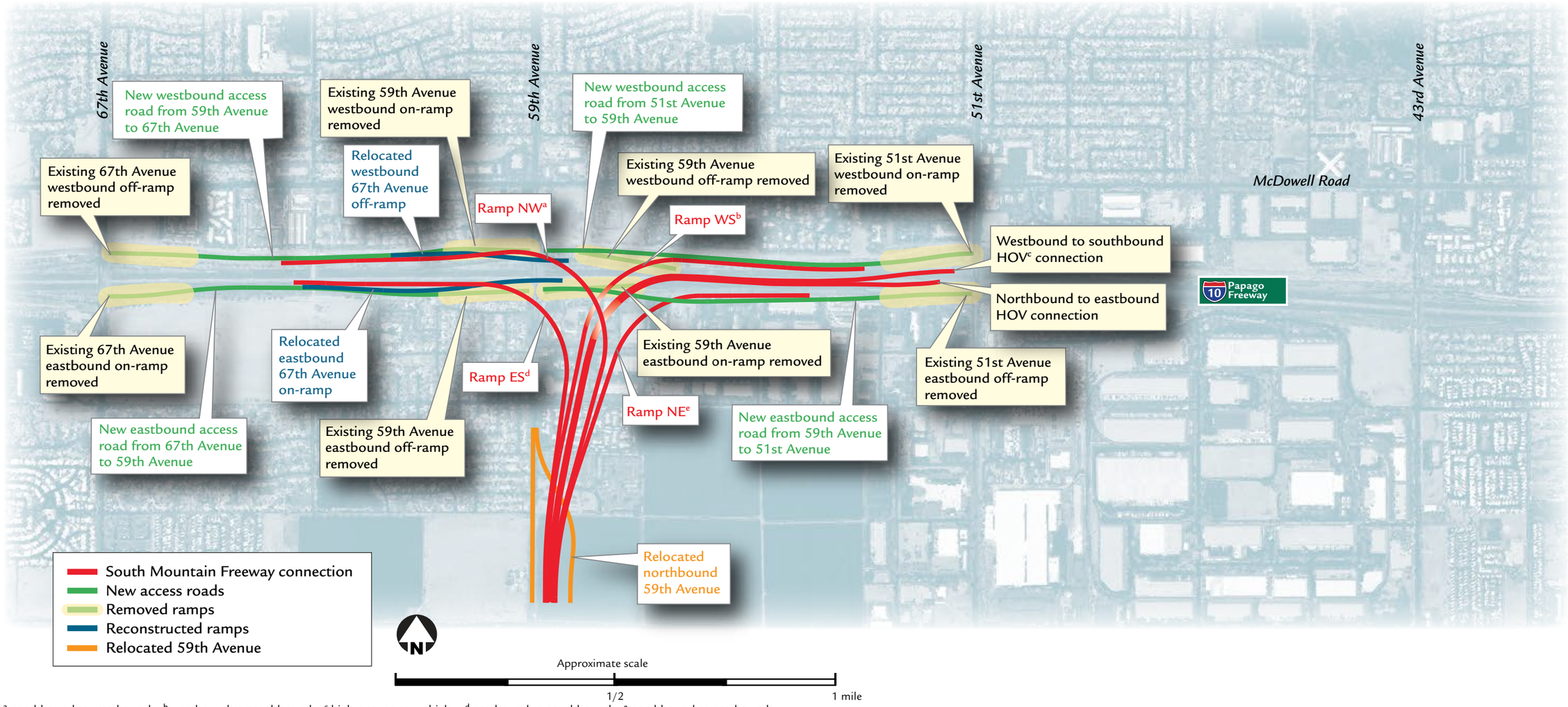
Between 1,818 and 2,203 acres would be converted from existing land uses to a transportation use to construct the

Table 3-12 Acreage Needed, Action Alternatives, Western and Eastern Sections

Location	Action Alternative					
	Western Section					Eastern Section
	W59	W71	W101[a]			E1
			Western	Central	Eastern	
I-10[b] (Papago Freeway) to Buckeye Road	184[c]	155[c]	249[c]	280[c]	278[c]	Does not apply
Buckeye Road to Southern Avenue	332	352	465	411	428	
Southern Avenue to common point[d]	419	554	597	598	598	
Common point to 17th Avenue	Does not apply					503[c]
17th Avenue to I-10 (Maricopa Freeway)						380
Total	935	1,061	1,311	1,289	1,304	883

[a] Acreage is needed for the Partial Reconstruction Option, which would use 5 more acres than the Full Reconstruction Option because of additional right-of-way (R/W) along State Route 101L.
[b] Interstate 10
[c] Calculations to determine total acreage for R/W acquisition were taken from concept-level plans (see sidebar regarding the level of design for the proposed action on page 3-40). Total R/W requirements would be subject to modification during the final design phase.
[d] See text box, *Creation of Western and Eastern Sections for the FEIS*, on page 3-8.

Figure 3-29 Local Access Modifications, Service Traffic Interchanges, W59 Alternative, Western Section



Signs would be installed to provide motorists with information regarding how to gain access to local arterial streets from Interstate 10 (Papago Freeway) resulting from modifications caused by the W59 Alternative system traffic interchange.

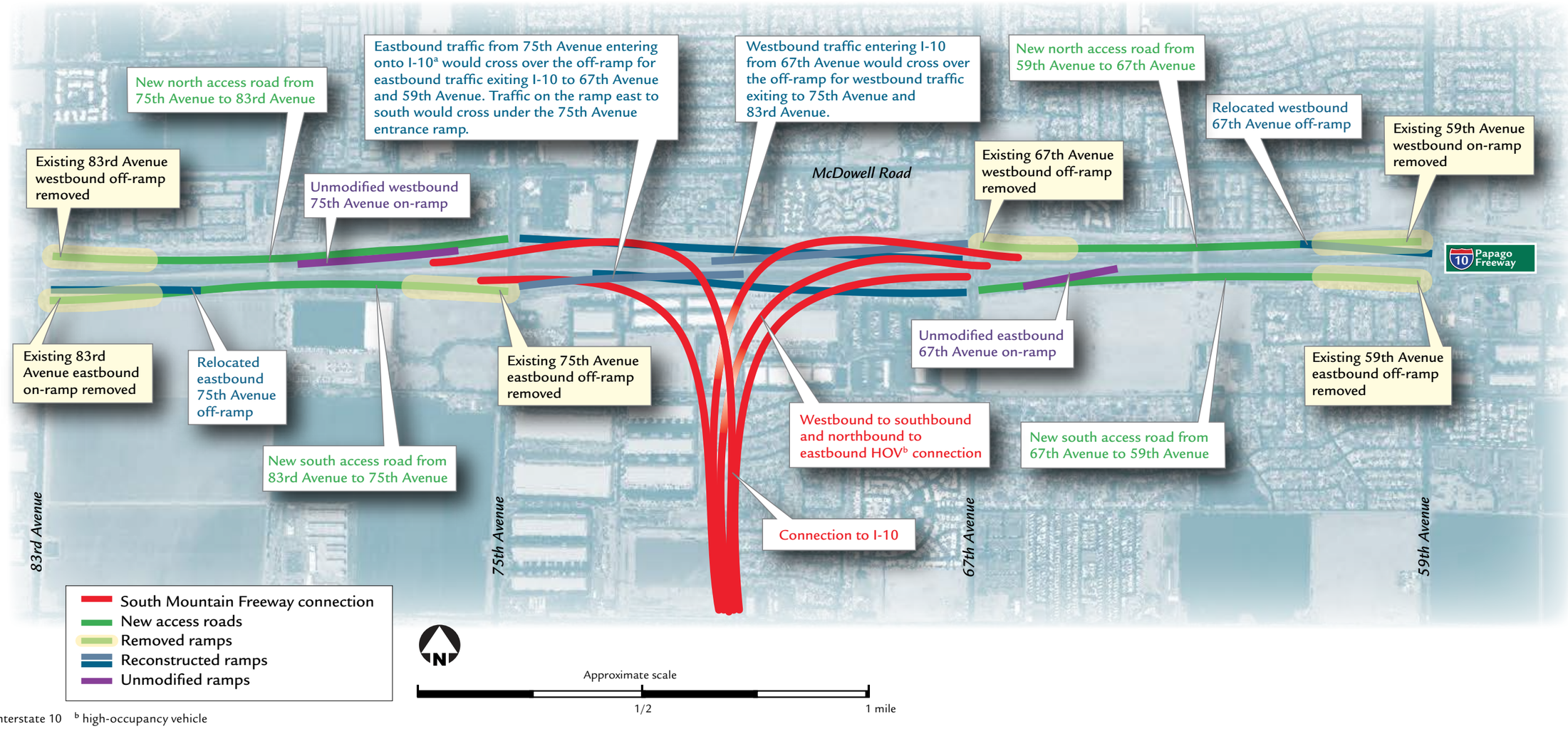
proposed action, depending on which action alternative were to be identified, if any. Total R/W requirements would be subject to modification during the concept-level design phase.

The conversion by land use type to a transportation use (the proposed action) for each action alternative is presented in the section, *Land Use*, beginning on page 4-3.

The acreage of new R/W needed for the action alternatives is typical for a project of this magnitude; R/W needed for the 17-mile portion of SR 202L (Red Mountain Freeway) from SR 87 (Beeline Highway) to US 60 (Superstition Freeway) was approximately 1,200 acres.

ADOT began acquiring land for the original alignment R/W in 1988. Between 1988 and 2001, ADOT acquired approximately 293 acres. Most of this land (258 acres) is located in the Eastern Section along Pecos Road. In 2006, ADOT began protective and hardship land acquisition in the alignment R/W footprint for the W59 and E1 Alternatives. Between 2006 and October 2013, ADOT purchased 326 acres (303 in the Western Section and 23 in the Eastern Section).

Figure 3-30 Local Access Modifications, Service Traffic Interchanges, W71 Alternative, Western Section



[a] Interstate 10 [b] high-occupancy vehicle

As with the W59 Alternative (see Figure 3-29), signs would be installed to provide motorists with information regarding how to gain access to local arterial streets from Interstate 10 (Papago Freeway) resulting from modifications caused by the W71 Alternative system traffic interchange.

Other Major Design Features Common to Action Alternatives

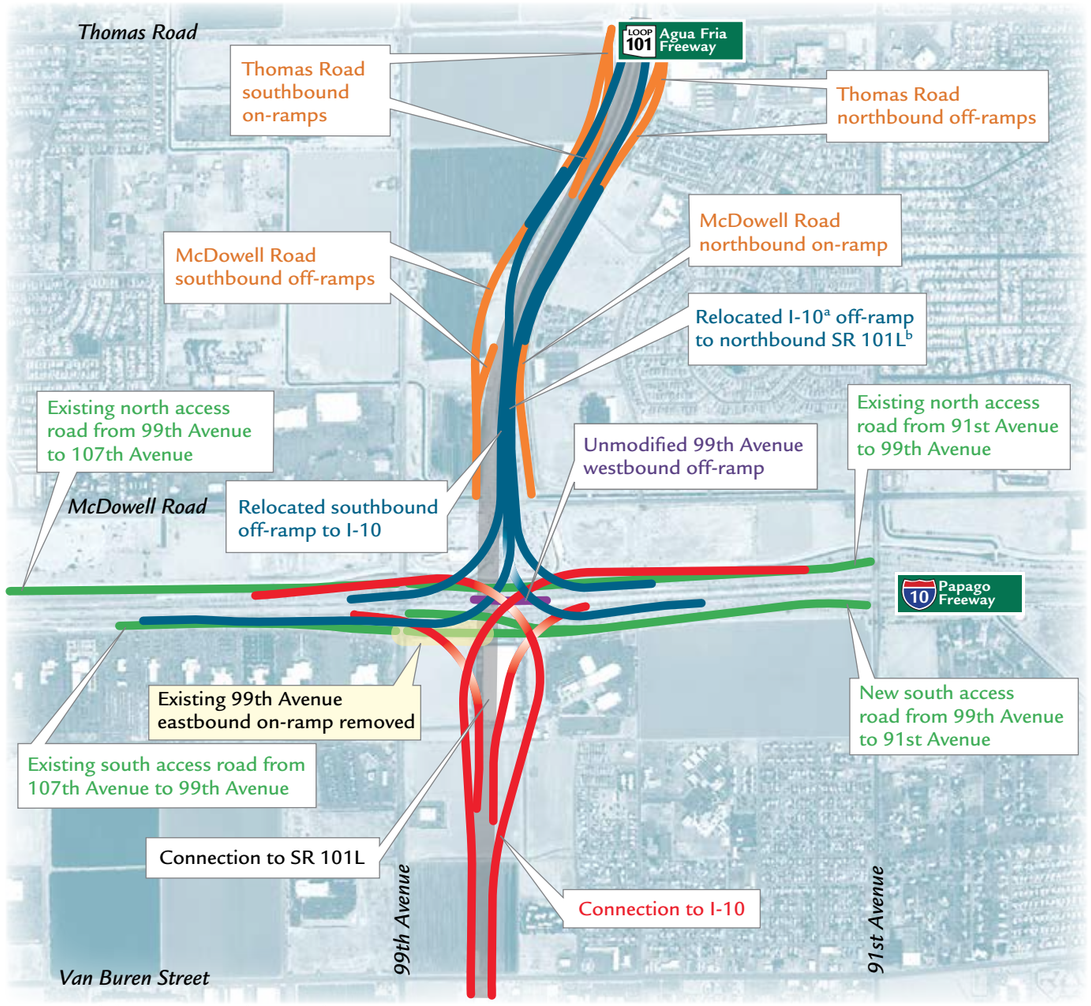
Design Criteria

The design criteria used to develop the action alternatives meet standards and guidelines in use by ADOT, FHWA, and AASHTO as set forth in:

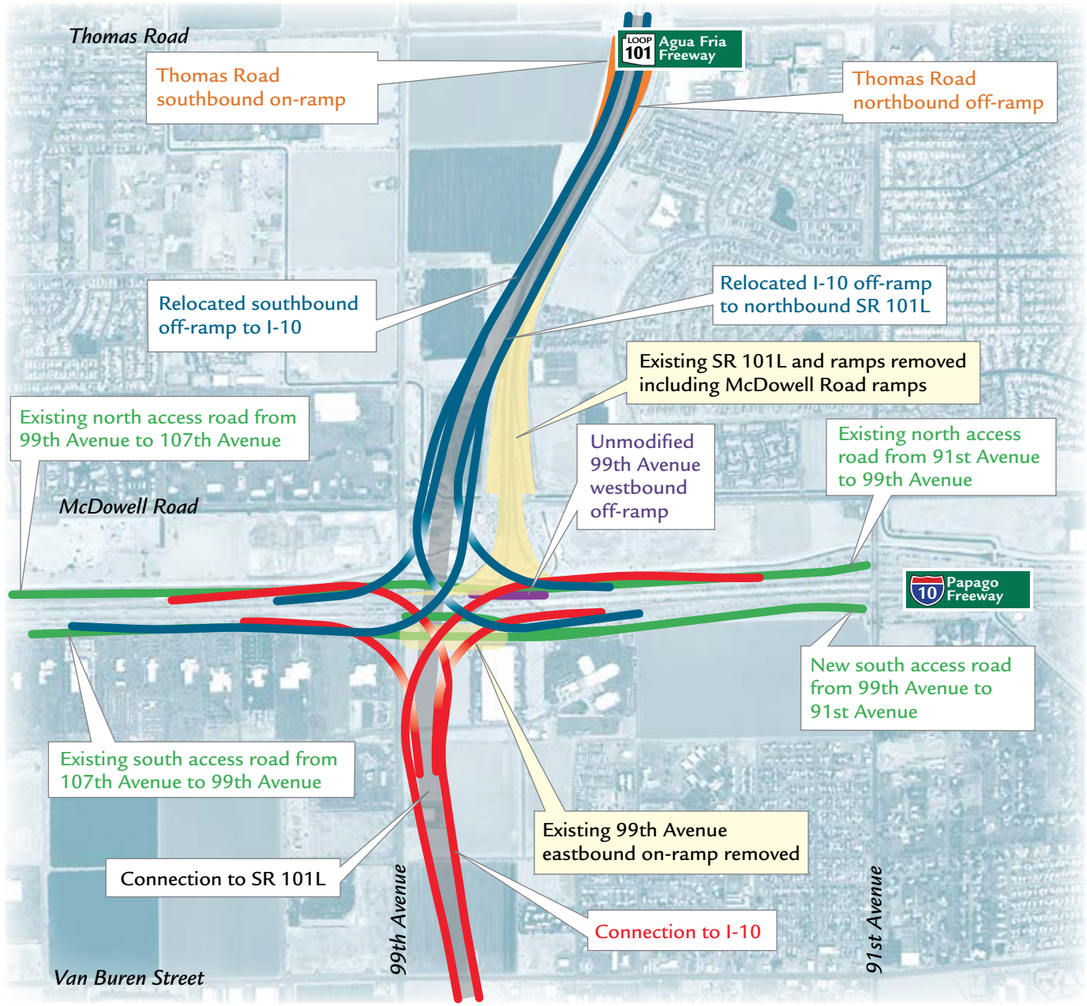
- *Roadway Design Guidelines* (ADOT 2012a)
- *Interim Auxiliary Lane Design Guidelines* (ADOT 1996)
- *A Policy on Geometric Design of Highways and Streets* (AASHTO 2011a)
- *Roadside Design Guide* (AASHTO 2011b)

Deviation from design standards is not expected for any of the action alternatives.

Figure 3-31 Local Access Modifications, W101 Alternative, Service Traffic Interchanges, Partial and Full Reconstruction Options, Western Section



Partial Reconstruction Option



Full Reconstruction Option

South Mountain Freeway connection
Access roads
Removed ramps
Reconstructed ramps
Reconstructed service ramps
Unmodified ramps
SR 101L/SR 202L[c] connector
N
Approximate scale
1/4 1/2 mile

[a] Interstate 10 [b] State Route 101L (Loop 101) [c] State Route 202L (Loop 202)

The Partial Reconstruction Option would keep intact much of the existing connection between Interstate 10 (Papago Freeway) and State Route 101L (Agua Fria Freeway) and the existing local access to McDowell Road and Thomas Road. The Full Reconstruction Option would replace the existing connection and remove the local access that exists now at McDowell Road. Either option (Partial or Full Reconstruction) would look and operate similarly to other major interchanges in the region such as the Interstate 17/State Route 101L (Pima Freeway) interchange.

Figure 3-32 Local Street Realignments, W59 Alternative (Preferred Alternative), Western Section

The W59 Alternative would affect the existing local street network. Approaches for reconfiguring the local street network include removing streets, constructing new streets, constructing the proposed freeway over existing streets, or dead-ending existing streets. Final design of local streets would be coordinated with emergency service providers, local jurisdictions, and other appropriate agencies and would continue through final design stages.